Marc Sabat

Surface slips away

for bassoon, steel-string guitar and cello

PLAINSOUND MUSIC EDITION

Surface slips away (2013–14)

for bassoon, steel-string guitar and violoncello

commissioned by Pascal Gallois, Magnus Andersson and Rohan de Saram

Time is but the stream I go a-fishing in.
I drink at it; but while I drink I see the sandy bottom and detect how shallow it is.
Its thin current slides away, but eternity remains.
I would drink deeper; fish in the sky, whose bottom is pebbly with stars.
I cannot count one.
I know not the first letter of the alphabet.

– Henry David Thoreau, “Where I Lived, and What I Lived For” from “Walden” (1845–54)

Surface slips away is the echo of an imaginary trio sonata for solo basso continuo ensemble, composed in four episodes. Reflections and refractions of parodoxic mirror (a)symmetries of musical intervals are observed through the lens of scordature (retunings, indicated by a system of accidentals in Just Intonation as well as by measurement in cent deviations from Equal Temperament).

Music begins as musicians patiently set and adjust each of their 10 open strings into a special constellation by testing and correcting unisons, near-unisons and slow beatings. This process juxtaposes tuneable intervals derived from the first 16 harmonic partials, played and combined in various forms by cello and bassoon, with very close tempered approximations made possible on the fretted equal tempered guitar. Each of the six strings of the guitar is shifted away from Equal Tempered tuning by a different fraction of a semitone divided into 6 parts, together producing a division of the octave in 72 “tempered commas”. The resulting harmonies suggest an enharmonically modulating harmonic space. Fine gradations of melody cast out ever greater harmonic distances and the flowing of musical time is offered as an unfinished space of interruptions, recurrences, eddies and whorls.

The music was composed in Seidmar and Berlin over the course of 2013 and early 2014. The various musical episodes were inspired by the writings of Henry David Thoreau and by reflections on theories about the origins of the minor chord, from, among others, Zarlino, Rameau, Tartini, Hauptmann, Oettingen, Riemann and Partch.

April 2014

for Christian Wolff upon his 80th birthday
in March 2014

An informal introduction to the Helmholtz-Ellis Accidentals
by Marc Sabat

Berlin, April 2009

In learning to read HE accidentals, without having to rely on an electronic tuning device, it is important to be familiar with three things:

First, to keep in mind the natural tuning of intervals in a harmonic series, which deviate from the tempered system.

Second, to get to know how the accidentals refer to these overtone relationships.

Third, to observe that each written pitch may be related to many other pitches by natural intervals, and to tune it accordingly.

In most cases, this approach will allow the player to quickly and intuitively play just intonation (JI) pitches quite accurately. Any remaining adjustments can be made by ear, based on the specific sound of JI intervals.

Just intervals are readily learned because they are built up from simple, tuneable harmonic relationships. These are generally based on eliminating beating between common partials, finding common fundamentals and audible combination tones, and establishing a resonant, stable sonority which maximizes clarity: both of consonance and of dissonance.

A well-focussed JI sound is completely distinct from the irregular, fuzzy beating of tempered sounds. Just consonances, when marginally out of tune, beat slowly and sweetly and may be corrected with the most subtle adjustments of bowing or breath. Just dissonances produce a sharply pulsing regular rhythm and have very clear, distinct colors.

To become familiar with the notation and sounds of JI, the fundamental building blocks are prime number overtones 3, 5, 7, 11 and 13, each of which is associated with a specific pair of accidentals and a basic musical interval.

3 is associated with the signs flat, natural, sharp and refers to the series of untempered perfect fifths (Pythagorean intonation). Generally, A is taken as the tuning reference, and the central pitches C-G-D-A-E can be imagined as the normal tuning of the orchestral string instruments. The just C is rather lower than tempered tuning because of the pure fifths. The further this series is extended, the greater the deviation from tempered tuning: the flats are lower, the sharps higher.

5 is associated with arrows attached to the flat, natural, sharp signs and refers to the pure major third. These arrows correct the Pythagorean intervals by a Syntonic Comma, which is approximately 1/9 of a wholetone or 22 cents. So, for example, the note E-flat arrow-up is a just major third below G, and the note F-sharp arrow-down is a major third above D. In most music, flats are often raised by a comma and sharps are lowered. Because of the open string tuning, it is common to sometimes raise F and C (to match A and E) and to sometimes lower A and E (to match F and C). Corrections by one Syntonic Comma have been used throughout Western music history and are relatively familiar to the ear. However, traditionally these corrections have been hidden by players, for example in Meantone Temperament where fifths are mistuned narrow by ! comma so that the third C-E ends up sounding pure. More recently, the currently prevailing Equal Temperament has made us accustomed to beating thirds, so at first the pure intervals may seem unfamiliar. To play the arrows accurately, one must carefully learn the sound of the consonant major and minor thirds and sixths, and learn to articulate comma differences clearly.

7 is associated with a Tartini sign resembling the numeral. It corrects the Pythagorean intervals by a Septimal Comma, which is approximately 1/7 of a wholetone or 27 cents. When the Pythagorean minor third is lowered by this amount, it becomes a noticeably low third often heard in Blues music.

11 is associated with the quartertone signs (cross and backwards flat). The accidental is used to raise the perfect fourth by 53 cents, producing the exact tuning of the 11th partial in a harmonic series. The sound is most easily learned by playing one octave plus one fourth and raising it by a quartertone.

13 is associated with the thirdtone signs (cross and backwards flat, each with 2 verticals). The accidental is used to lower the Pythagorean major sixth by 65 cents, producing the exact tuning of the 13th partial in a harmonic series. The sound is most easily learned as a neutral-sounding sixth, one-third of the way between the just minor and just major sixths (closer to minor than to major).

The following table presents the accidentals together with their associated ratios and cents deviations. To calculate the cents deviation from Equal Temperament of a specific written pitch (if desired) the following shortcut may be used:

1.) Find the cents deviation of the Pythagorean pitch, by calculating how many fifths it is away from A, multiplying by 2, and using a plus sign if it is on the sharp side and a minus if it is on the flat side.

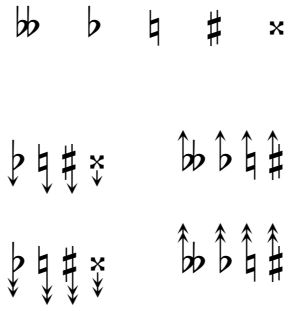
2.) For each microtonal accidental, add or subtract its approximate cents value (as given above), keeping in mind whether the accidental is raising or lowering the pitch.

The resulting value should be a cents deviation within 1 or 2 cents accuracy, which is an acceptable starting point for fine-tuning by ear.

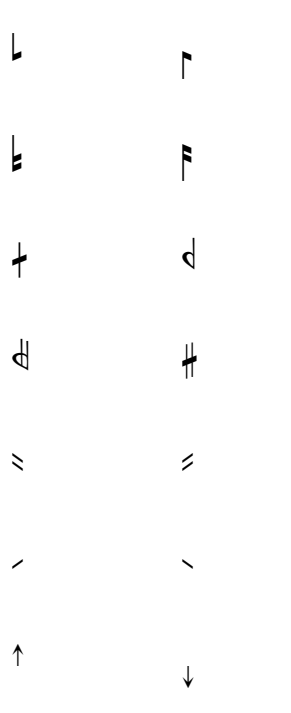
ACCIDENTALS **EXTENDED HELMHOLTZ-ELLIS JI PITCH NOTATION**

for Just Intonation
designed by Marc Sabat and Wolfgang von Schweinitz

The exact intonation of each pitch may be written out by means of the following harmonically-defined signs:



Pythagorean series of fifths – the open strings
(… c g d a e …)



lowers / raises by a syntonic comma
81 : 80 = ***circa 21.5 cents***

lowers / raises by two syntonic commas
circa 43 cents

lowers / raises by a septimal comma
64 : 63 = ***circa 27.3 cents***

lowers / raises by two septimal commas
circa 54.5 cents

raises / lowers by an 11-limit undecimal quarter-tone
33 : 32 = ***circa 53.3 cents***

lowers / raises by a 13-limit tridecimal third-tone
27 : 26 = ***circa 65.3 cents***

lowers / raises by a 17-limit schisma
256 : 255 = ***circa 6.8 cents***

raises / lowerss by a 19-limit schisma
513 : 512 = ***circa 3.4 cents***

raises / lowers by a 23-limit comma
736 : 729 = ***circa 16.5 cents***

In addition to the harmonic definition of a pitch by means of its accidentals, it is also possible to indicate its absolute pitch-height as a cents-deviation from the respectively indicated chromatic pitch in the 12-tone system of Equal Temperament.

The attached arrows for alteration by a syntonic comma are transcriptions of the notation that Hermann von Helmholtz used in his book "Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik" (1863).
The annotated English translation "On the Sensations of Tone as a Physiological Basis for the Theory of Music" (1875/1885) is by Alexander J. Ellis, who refined the definition of pitch within the 12-tone system of Equal Temperament by introducing a division of the octave into 1200 cents.
The sign for a septimal comma was devised by Giuseppe Tartini (1692-1770) – the composer, violinist and researcher who first studied the production of difference tones by means of double stops.

VORZEICHEN

EXTENDED HELMHOLTZ-ELLIS JI PITCH NOTATION

für die natürliche Stimmung
konzipiert von Marc Sabat und Wolfgang von Schweinitz

Die Stimmung jedes Tons ist mit folgenden harmonisch definierten Vorzeichen ausnotiert:

♭♭ ♭ ♮ ♯ ×

Pythagoreische Quintenreihe der leeren Streicher-Saiten
(. . . c g d a e . . .)

Erniedrigung / Erhöhung um ein Syntonisches Terzkomma
81 : 80 = ***circa 21.5 cents***

Erniedrigung / Erhöhung um zwei Syntonische Terzkommas
circa 43 cents

Erniedrigung / Erhöhung um ein Septimenkomma
64 : 63 = ***circa 27.3 cents***

Erniedrigung / Erhöhung um zwei Septimenkommas
circa 54.5 cents

Erhöhung / Erniedrigung um den undezimalen Viertelton der 11er-Relation 33 : 32 = ***circa 53.3 cents***

Erniedrigung / Erhöhung um den tridezimalen Drittelton der 13er-Relation 27 : 26 = ***circa 65.3 cents***

Erniedrigung / Erhöhung um ein Siebzehner-Schisma
256 : 255 = ***circa 6.8 cents***

Erhöhung / Erniedrigung um ein Neunzehner-Schisma
513 : 512 = ***circa 3.4 cents***

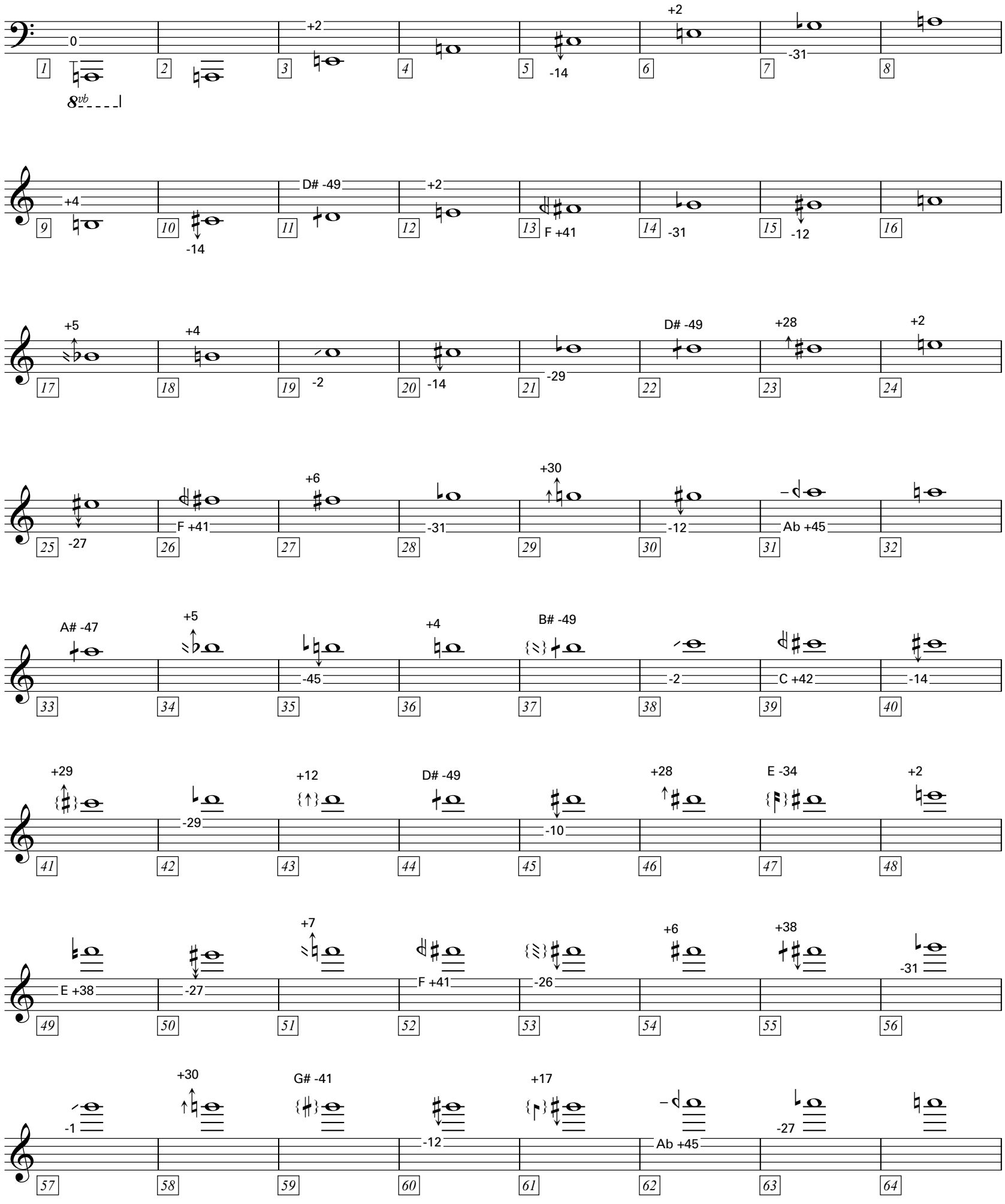
Erhöhung / Erniedrigung um ein Dreiundzwanziger-Komma
736 : 729 = ***circa 16.5 cents***

Zusätzlich zu der harmonischen Definition der Tonhöhe durch das Vorzeichen für jeden Ton ist auch der Cents-Wert der Abweichung der gewünschten Stimmung von der Tonhöhe des jeweils bezeichneten chromatischen Tons der gleichstufig temperierten Zwölfton-Skala angegeben.

Die attachierten Pfeile für die Alteration um ein Syntonisches Terzkomma sind eine bloße Transkription der Notation, die Hermann von Helmholtz in seinem Buch "Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik" (1863) verwendet hat. Die kommentierte englische Übersetzung "On the Sensations of Tone as a Physiological Basis for the Theory of Music" (1875/1885) stammt von Alexander J. Ellis, der auch eine enorme Verfeinerung der Tonhöhendefinition innerhalb des Zwölftonsystems der gleichstufig temperierten Stimmung durch die Unterteilung der Oktave in 1200 Cents eingeführt hat. – Das Vorzeichen für die Alteration um ein Septimenkomma wurde von Giuseppe Tartini (1692-1770) erfunden, der als Komponist, Geiger und Wissenschaftler die durch Doppelgriffe erzeugten Differenztöne untersucht hat.

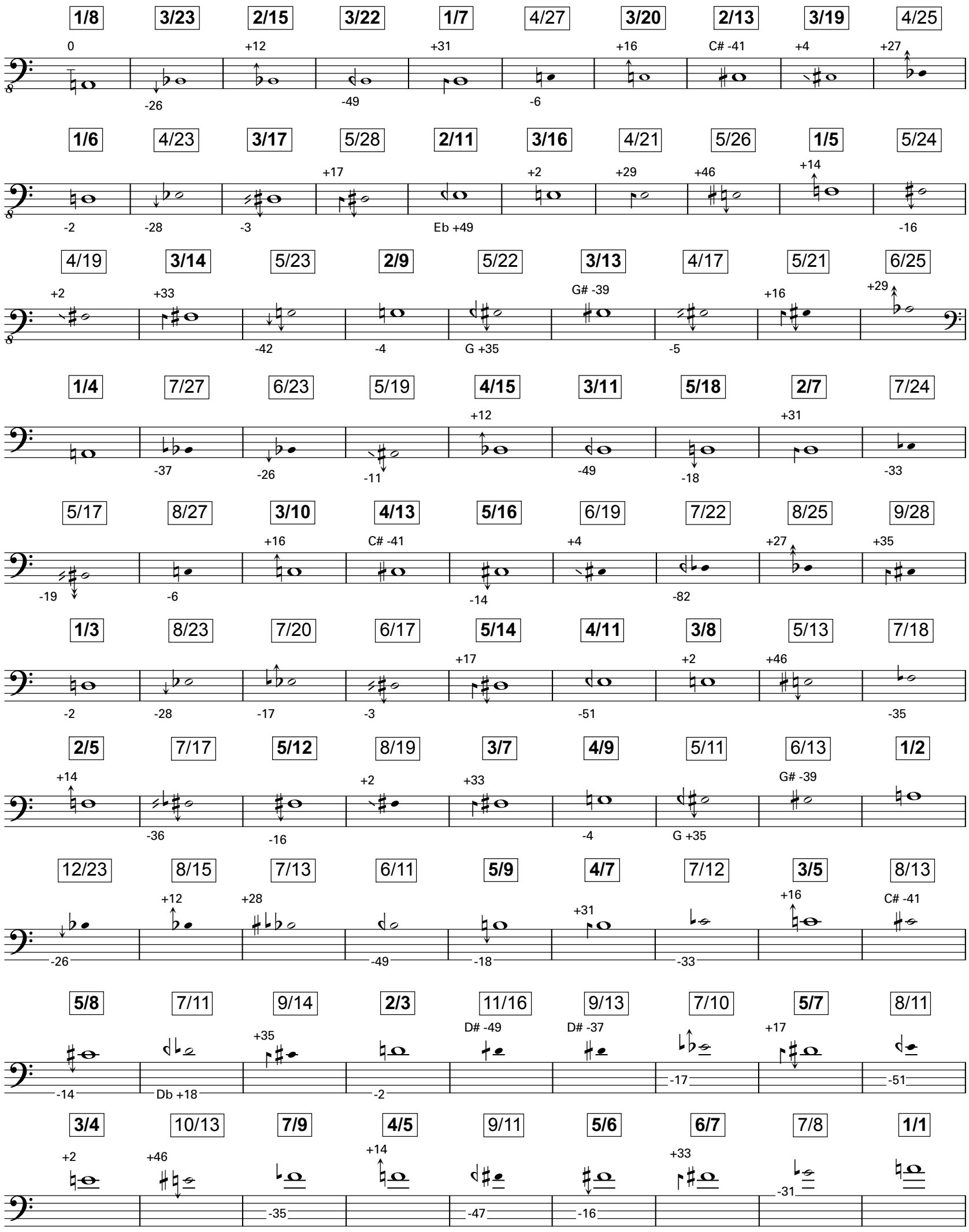
THE HARMONIC SERIES 1 - 64 above “A0” *(overtone row)*

notated using the Extended Helmholtz-Ellis JI Pitch Notation
microtonal accidentals designed by Marc Sabat and Wolfgang von Schweinitz, 2004



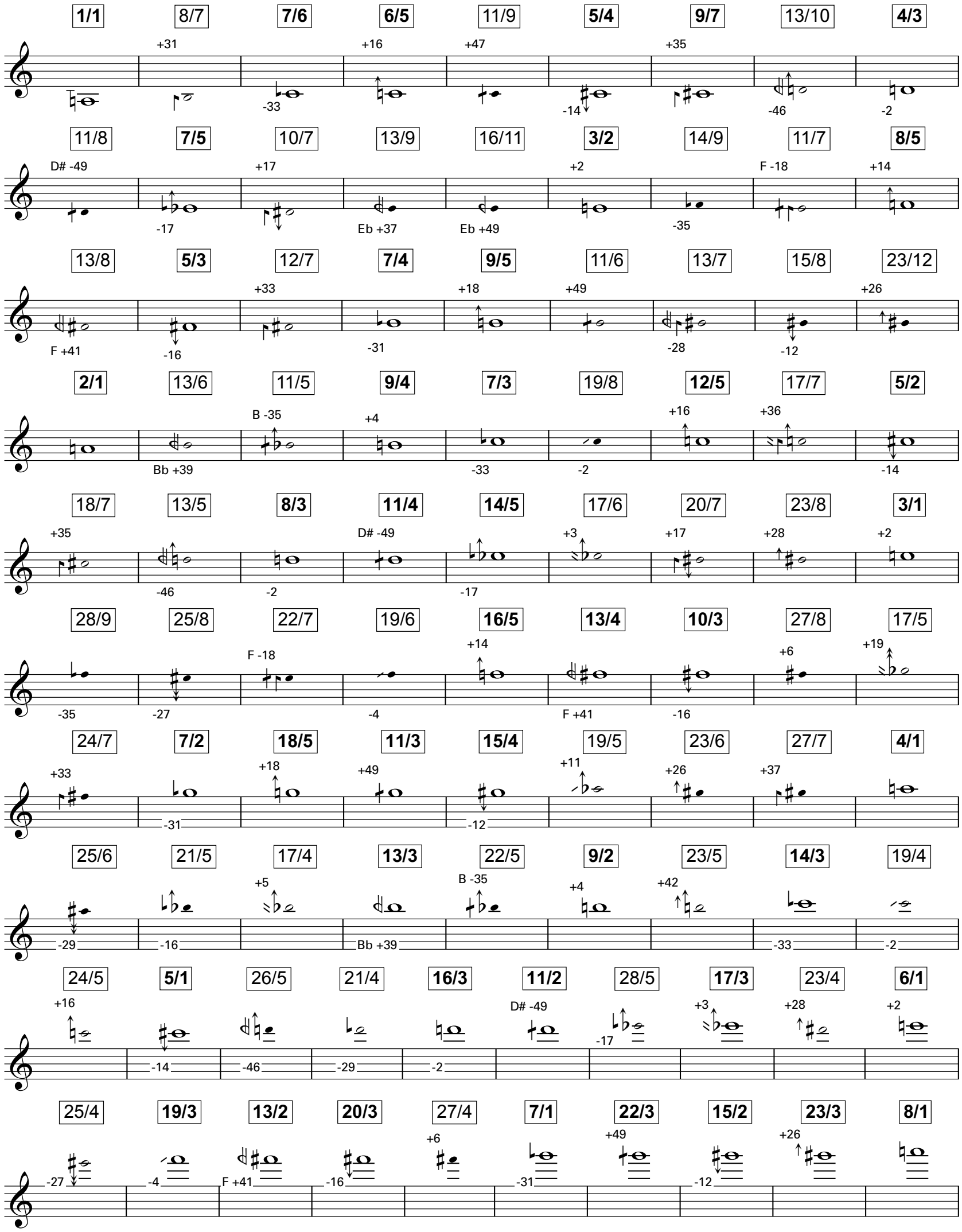
23-LIMIT TUNEABLE INTERVALS below “A4”

tested and notated in three gradations of difficulty (large open notehead = easiest ; small black notehead = most difficult)
by Marc Sabat (violin/viola) with assistance from Wolfgang von Schweinitz (cello), Beltane Ruiz (bass), Anaïs Chen (violin)—Berlin, 2005



23-LIMIT TUNEABLE INTERVALS above “A3”

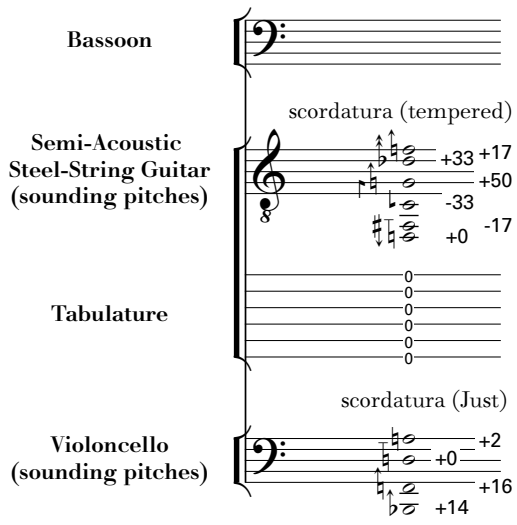
notated using the Extended Helmholtz-Ellis JI Pitch Notation with cents deviations from 12-tone equal temperament based on A = 0 cents
microtonal accidentals designed by Marc Sabat and Wolfgang von Schweinitz, 2004



Surface slips away

1 : Scordature

Marc Sabat



Begin from "A", playing the indicated material and proceeding freely, but aware of the other players' pitches. Guitar and cello, and optionally bassoon, play with a tuning meter, using a clip microphone to adjust tuning. Fine tuning of the open strings is generally of primary importance, alternating with coordinated passages in which players should also focus on carefully adjusting intervals occurring between instruments.

The styles of playing should be chosen to establish with definite clarity the most exact temperament or tuning of the sounds written. Try various dynamics, timbres, means of sound production, seeking to optimize the tuning process for all. For the most part, sustain colors to most easily perceive the effects of intonation.

The music flows freely between measured fragments and material which is chosen, played, and repeated "as needed". The two styles of playing should connect imperceptibly, as much as possible without breaks, taking (only) as much time as necessary.

(part is notated at sounding pitch: material on strings III and IV must be fingered higher by a small wholetone 9:10 to sound as written!)

A Senza misura, libero

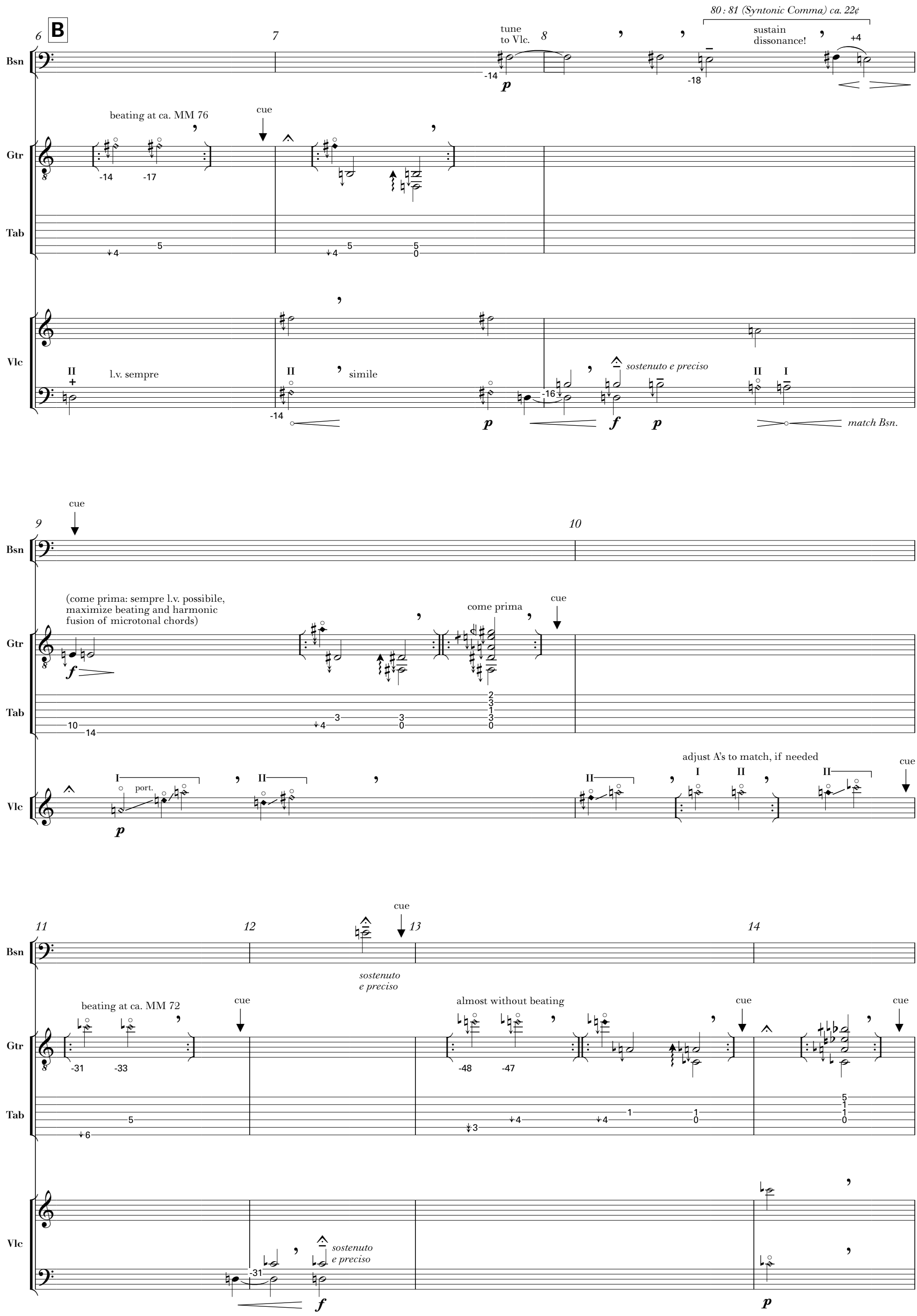
Guitar: pluck as often as needed, tune using a clip microphone and an electronic tuning meter with cents readout, also by ear to the other instruments; as in normal tuning, adjust, interrupt, repeat ad lib.; reuse material within repeat marks freely throughout the bar; sempre l.v. possibile.

Cello: please use a tailpiece with fine tuners for all four strings to permit very precise adjustments: tune using a clip microphone and an electronic tuning meter with cents readout, also by ear to the other instruments; as in normal tuning, rebow with a quiet, clear and focussed tone (preciso), adjust, interrupt, repeat ad lib.; reuse material within repeat marks freely throughout the bar.

Bsn: match Vlc. tuning, wait until adjustments are completed, begin from a unison, sustain long enough to overlap new pitch; produce a clear, even tone to maximize clarity of tuned intervals.

arpeggiando ad lib.

check unisons, intervals: try other combinations ad lib., continue to adjust strings as needed


B
6
7
8
9
10
11
12
13
14
80 : 81 (Syntonic Comma) ca. 22¢
tune to Vlc.
sustain dissonance!
beating at ca. MM 76
cue
l.v. sempre
simile
sostenuto e preciso
match Bsn.
(come prima: sempre l.v. possibile, maximize beating and harmonic fusion of microtonal chords)
come prima
port.
adjust A's to match, if needed
beating at ca. MM 72
almost without beating
Bsn
Gtr
Tab
Vlc

15 16 17 18

cue

Bsn

sostenuto
e preciso

p

Gtr

Tab

Vlc

I II

sostenuto
e preciso

f

II

p

f

II

p

I II

sostenuto
e preciso

p

II III

19 20 21

split
harmonic

cue

Gtr

Tab

Vlc

III

III

IV

cue

Bsn: melody of harmonic multiphonic mixtures over written fundamentals with high "F", overtones may be transposed 8vb ad lib.

8. partial 9. 10. 11.

22 23

match Vlc., Gtr.

Bsn

f

Gtr

f

Tab

Vlc

III

I II

sostenuto
e preciso

f

I II

sostenuto
e preciso

f

III

attacca

2 : Divided Fifth

Andante,
grazioso e scorrevole
♩ = 48

Bsn: use multiphonics ad lib.; at times produce a soft mixture of natural partials favouring the written harmonics and fundamentals (indicated by diamond notes), or simply play the melody of written microtonal pitches.

1

Bsn

-17 +14 +16 +14

sotto voce
sostenuto e legato possibile

poco f

allow guitar to emerge

sotto voce

balance and
tune to Cello

port.

Gtr

l.v. sempre,
a piacere

3:4 5:4

p *sf* *p* *sf* *p*

Tab

0 0 5 0 0 14 0 12

Vlc

3:4

harmonics,
portamento

5:4

press down III
so only IV and II
sound together

3:4

come prima

5:4

allow guitar to emerge

3:4 5:4

f *poco f* *poco f* *sim.*

+30

3:4 5:4 3:4 5:4

4

Bsn

+33 +35

come prima

C# -39

3:4

poco f *sotto voce* *port.* *poco f* *sotto voce* *port.* *poco f*

Gtr

3:4 5:4 3:4 5:4 3:4

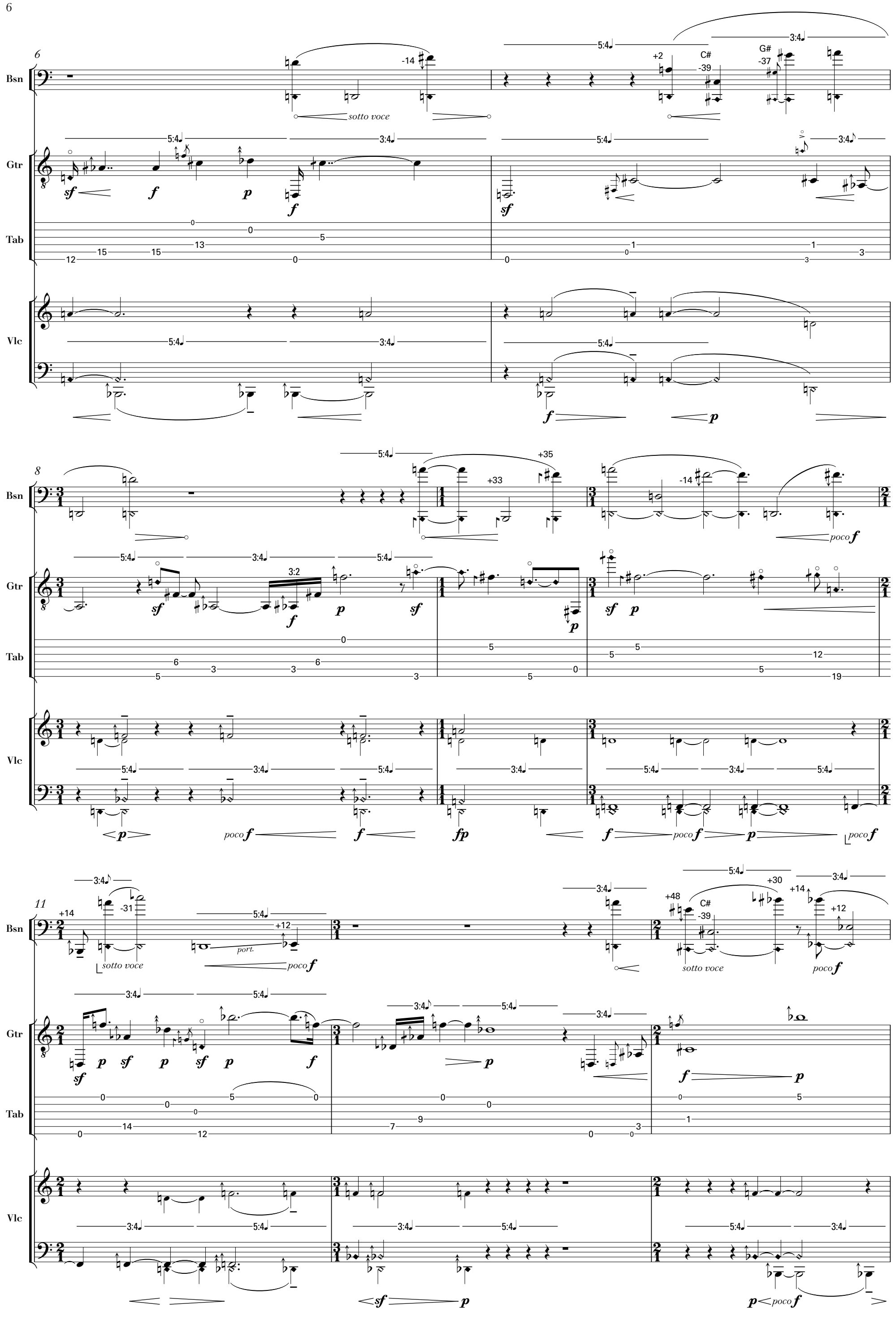
f *sf* *f* *sf* *p f* *f* *p* *f* *mp* *mf* *mp* *mf* *f* *p*

Tab

12 10 7 9 9 12 0 12 13 13 12 0 0 12 9 13 0 0 9 0 0 13 0 0 0 0

Vlc

3:4 5:4 3:4 5:4 3:4


6
Bsn
Gtr
Tab
Vlc
sotto voce
8
poco f
11
port.
sotto voce
poco f

14

Bsn

Gtr

Tab

Vlc

sf *p* *f* *p* *sf*

fp *sotto voce* *sotto voce* *poco f* *p*

17

Bsn

Gtr

Tab

Vlc

f *sf* *f* *p* *f* *p*

20

Bsn

Gtr

Tab

Vlc

poco f *f* *p* *f*

23

Bsn

sotto voce

poco f

sotto voce

poco f

Gtr

sf

sf

f

Tab

Vlc

f

III
IV

sostenuto

25

Bsn

sotto voce

Gtr

p

f

p

sf

Tab

Vlc

sfp

p dolce

f

28

Bsn

poco f

sotto voce

port.

poco f

sotto voce

Gtr

sf

p

f

p

p

sf

sf

p

sf

sf

Tab

Vlc

port.

poco f

p

31

Bsn

Gtr

Tab

Vlc

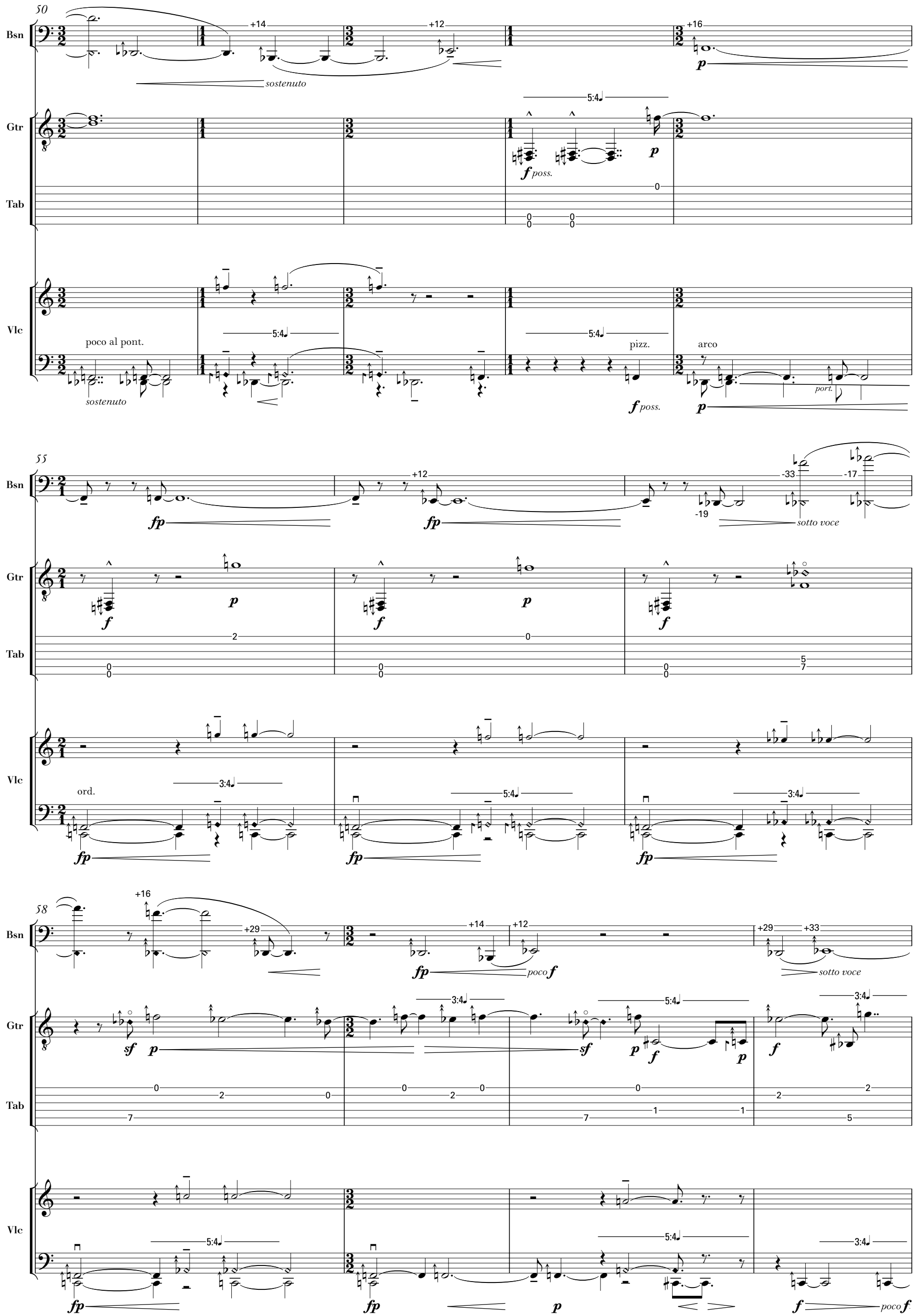
sotto voce

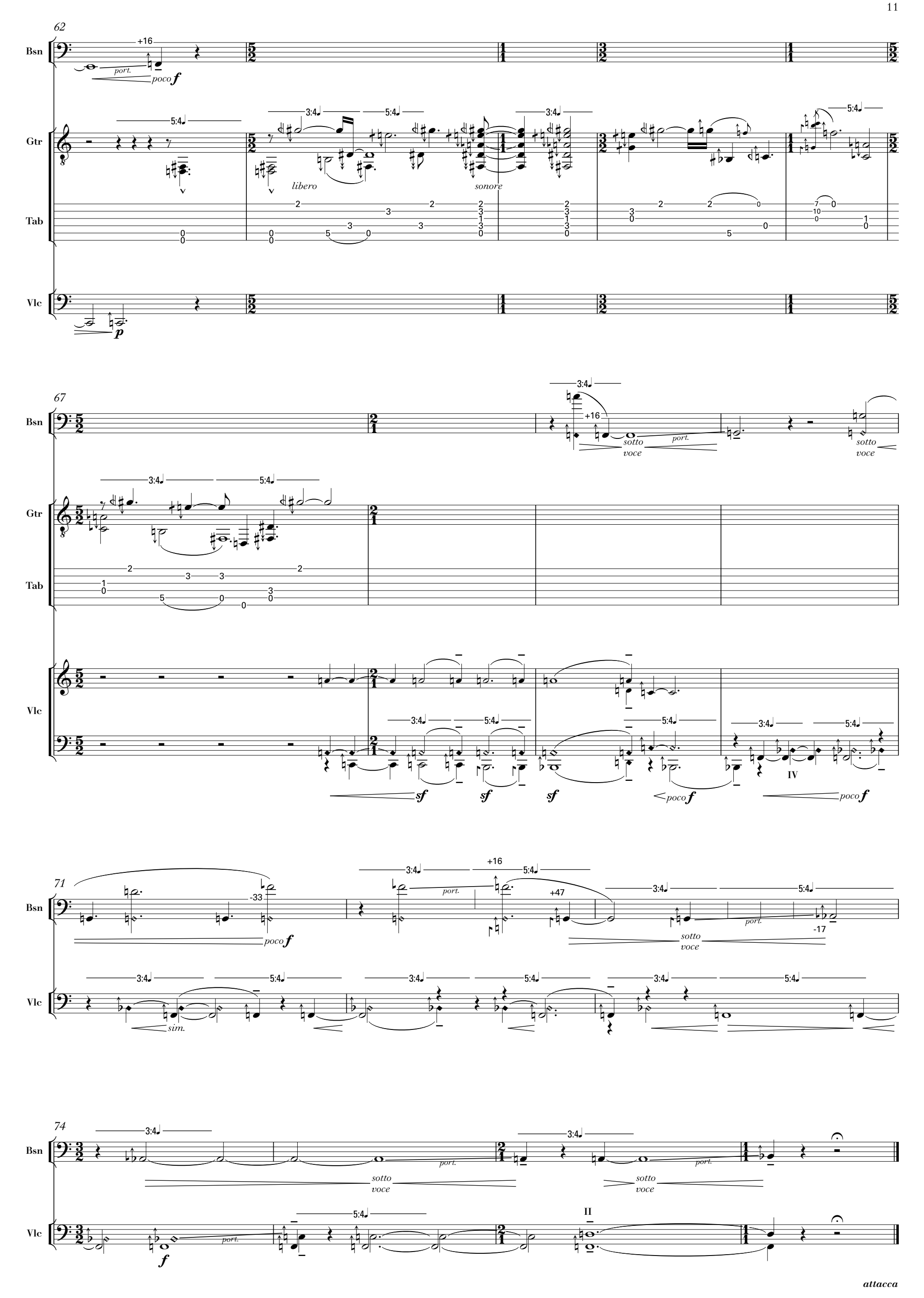
38

poco f

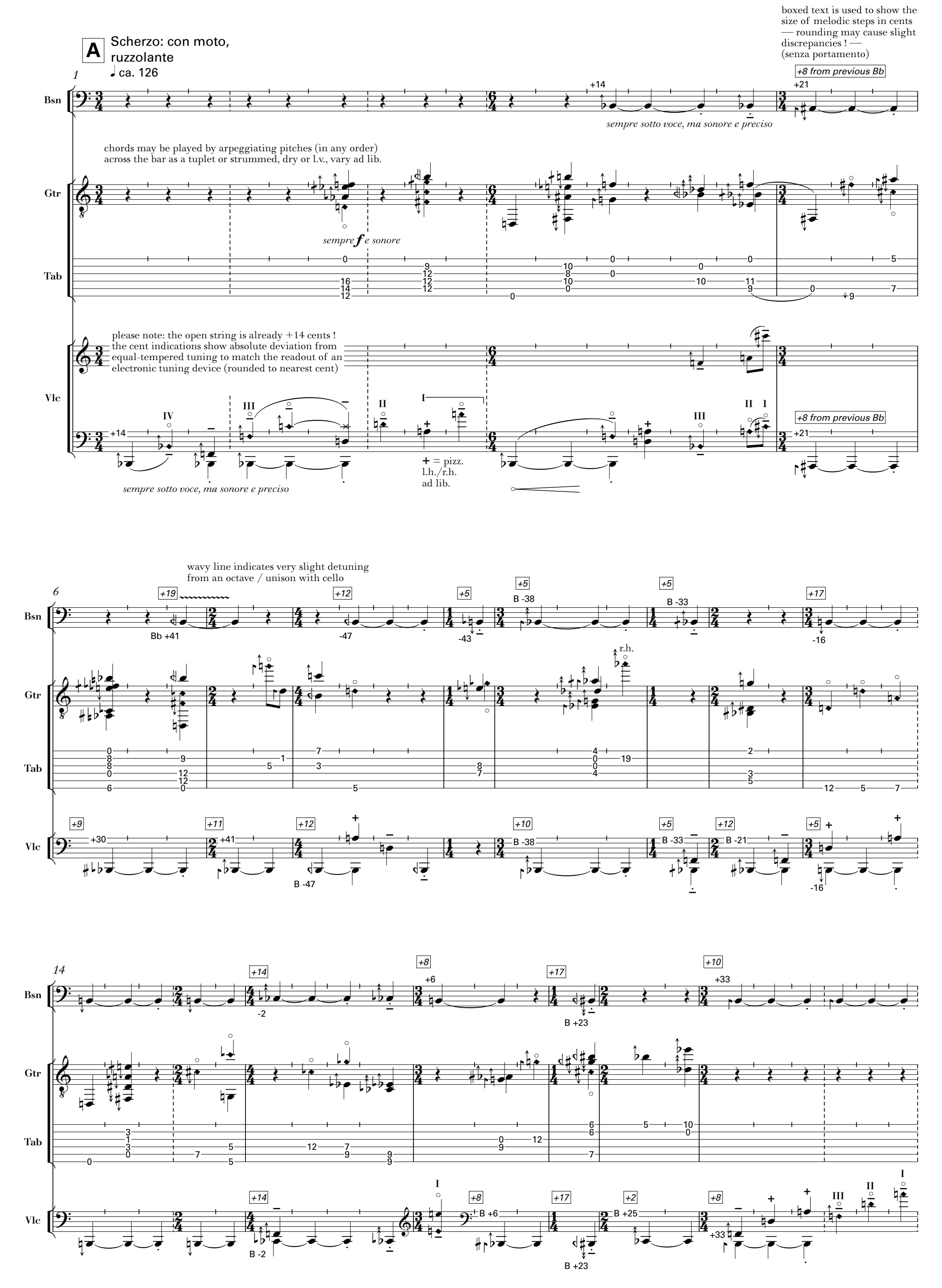
44

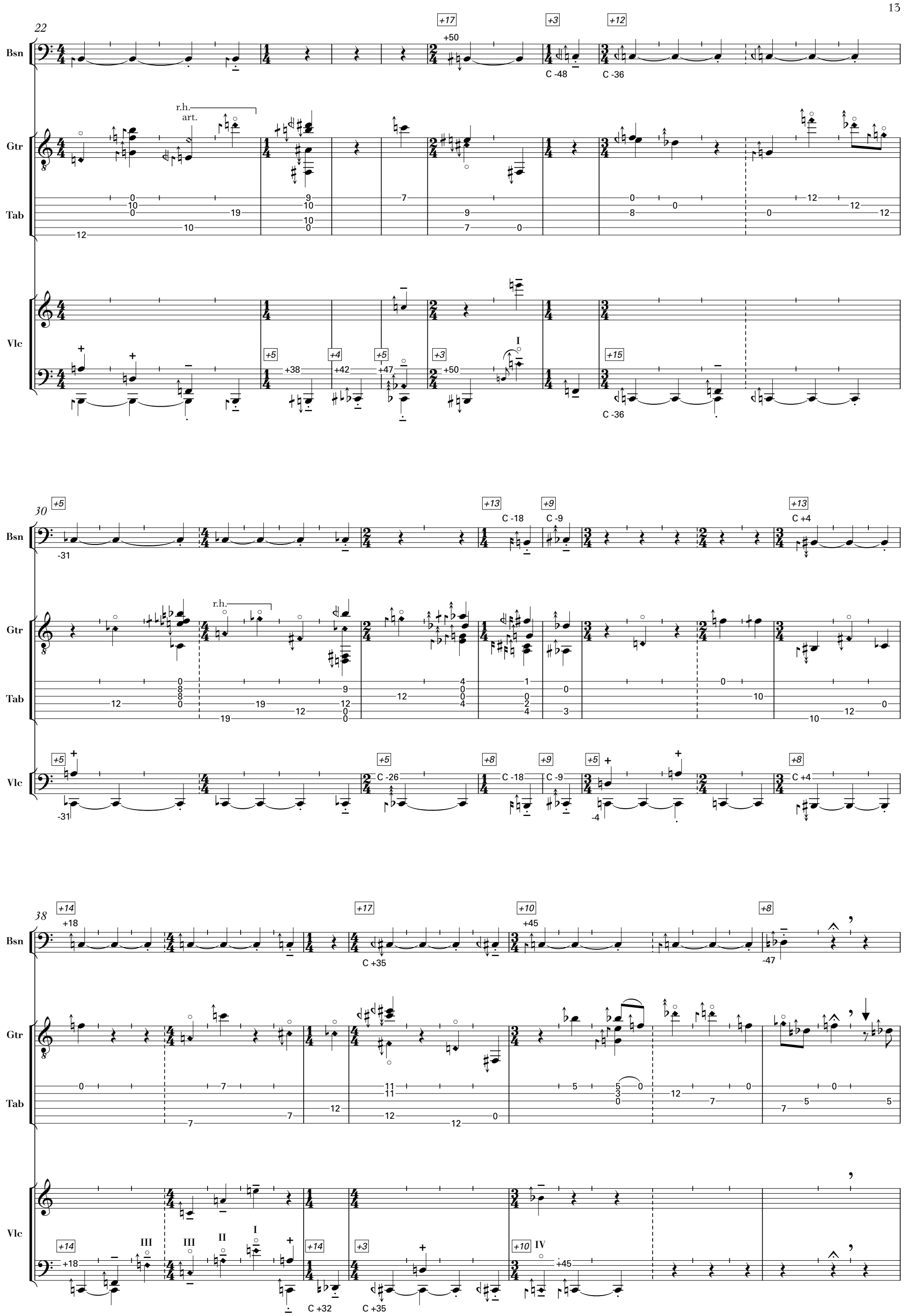
sostenuto

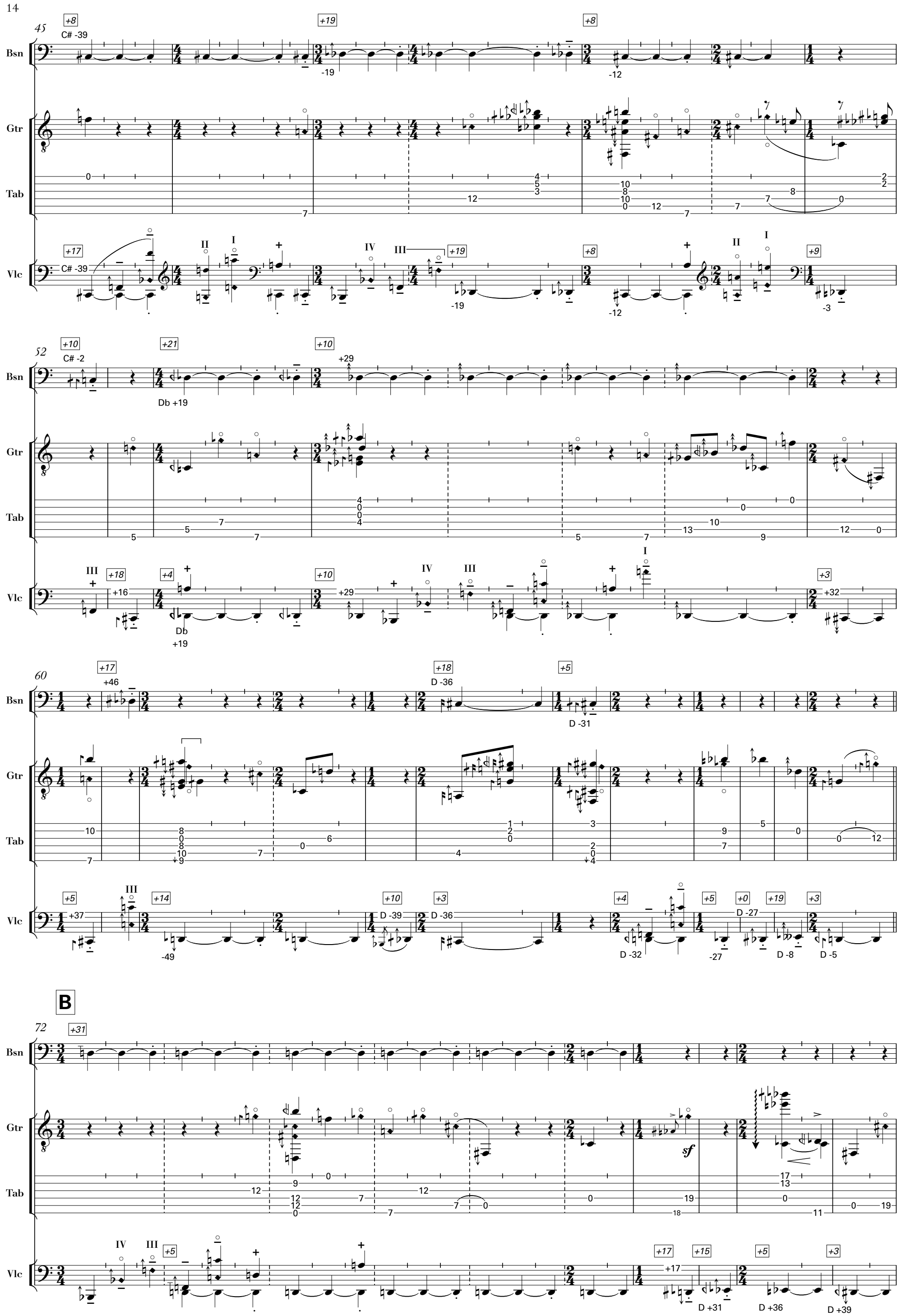

50
Bsn
Gtr
Tab
Vlc
sostenuto
poco al pont.
pizz.
arco
port.
55
sotto voce
ord.
58
poco f


62
Bsn
Gtr
Tab
Vlc
+16
port.
poco f
5:4
3:4
libero
sonore
p
67
sotto voce
sf
poco f
IV
71
-33
+47
-17
sim.
74
II
f
attacca

3 : Helmholtz's Sirens




22
Bsn
Gtr
Tab
Vlc
r.h.
art.
30
38
r.h.


45
Bsn
Gtr
Tab
Vlc
52
60
B
72

82

Gtr

Tab

Vlc

+2 D +41 +8 +49 sonore +14 -37 +5 -32

88

Bsn

Gtr

Tab

Vlc

+3 -29 +5 D# -24 +4 -20 +5 -16 +8 D# -7

tune boxed intervals to Cello:

95

15/8 13/7

Bsn

Gtr

Tab

Vlc

+19 +12 8/15 +8 +19 tune boxed intervals to Bassoon: 3 II III +9 +28 7/13 +5 +33

102

11/6

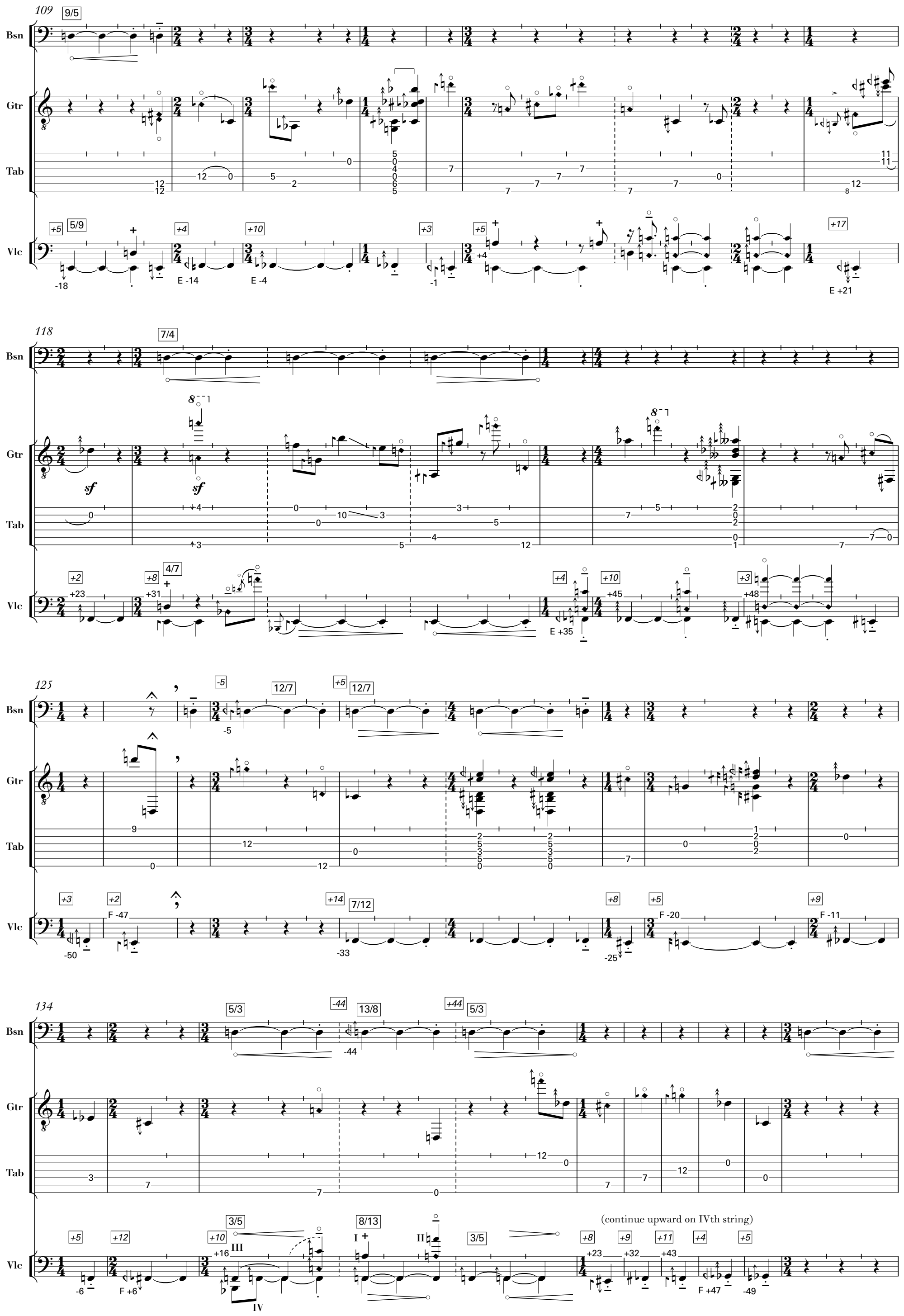
Bsn

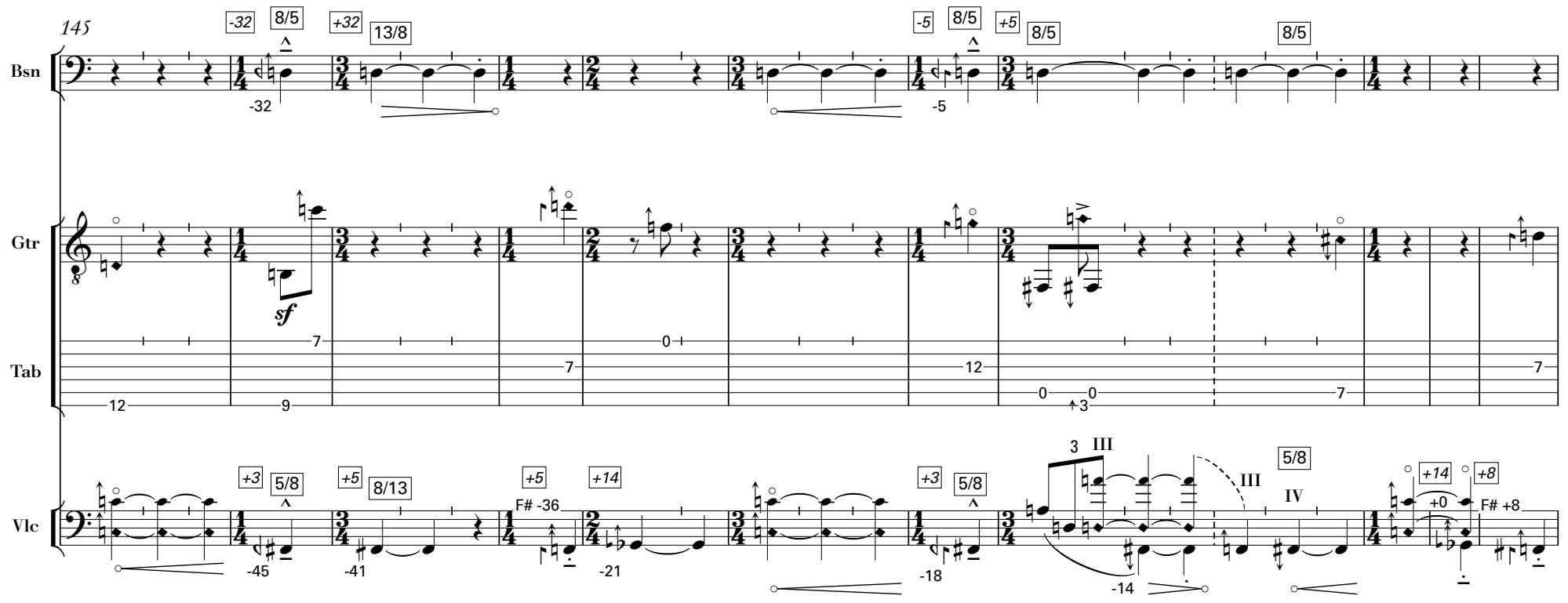
Gtr

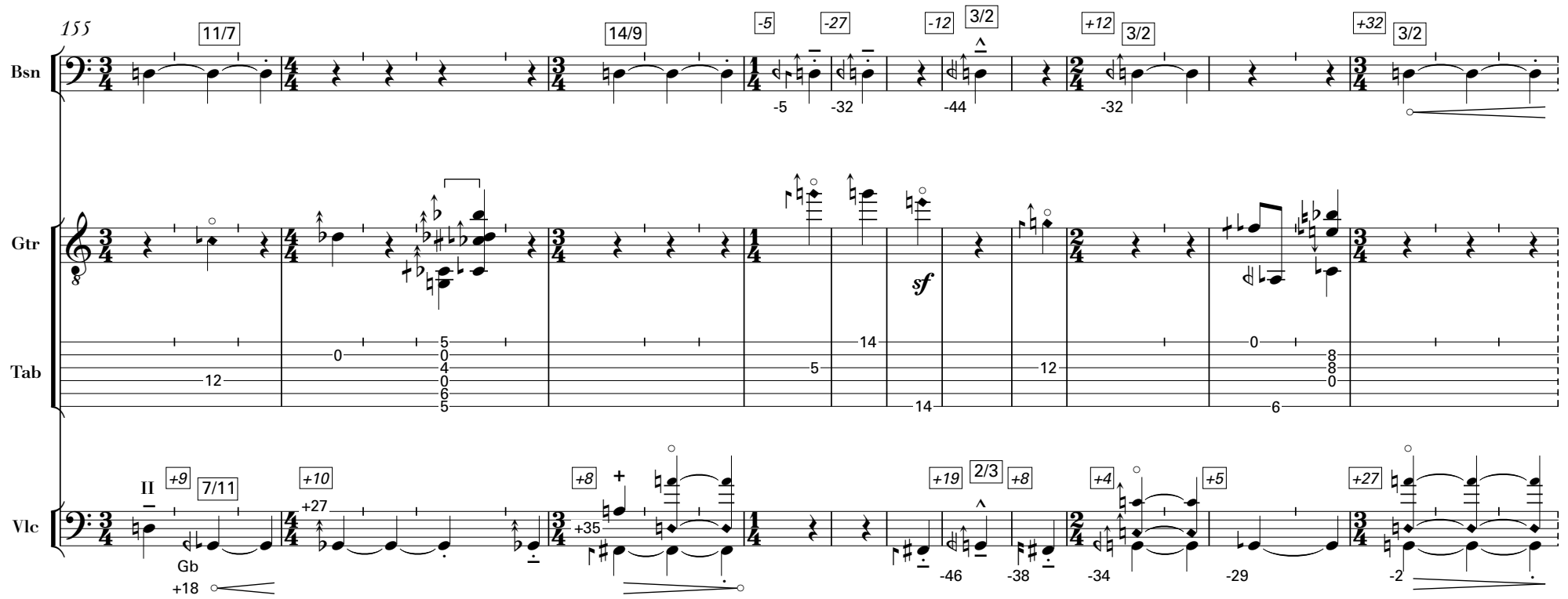
Tab

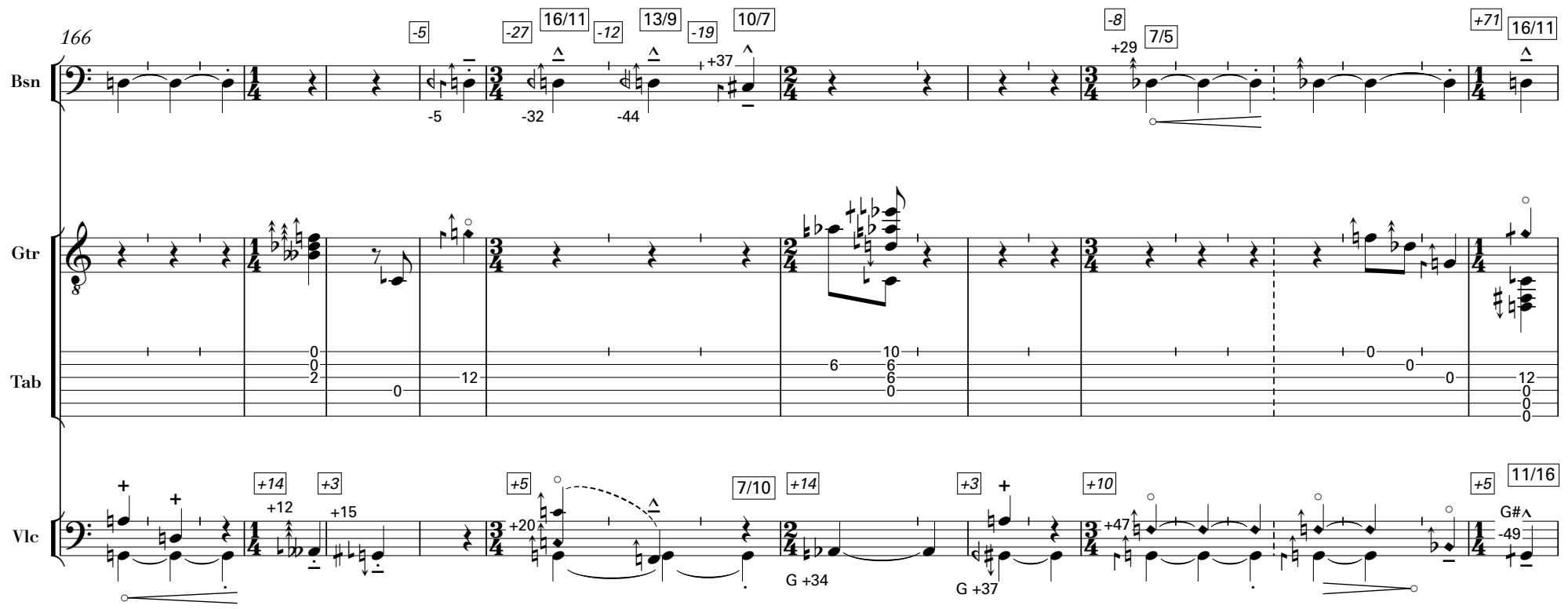
Vlc

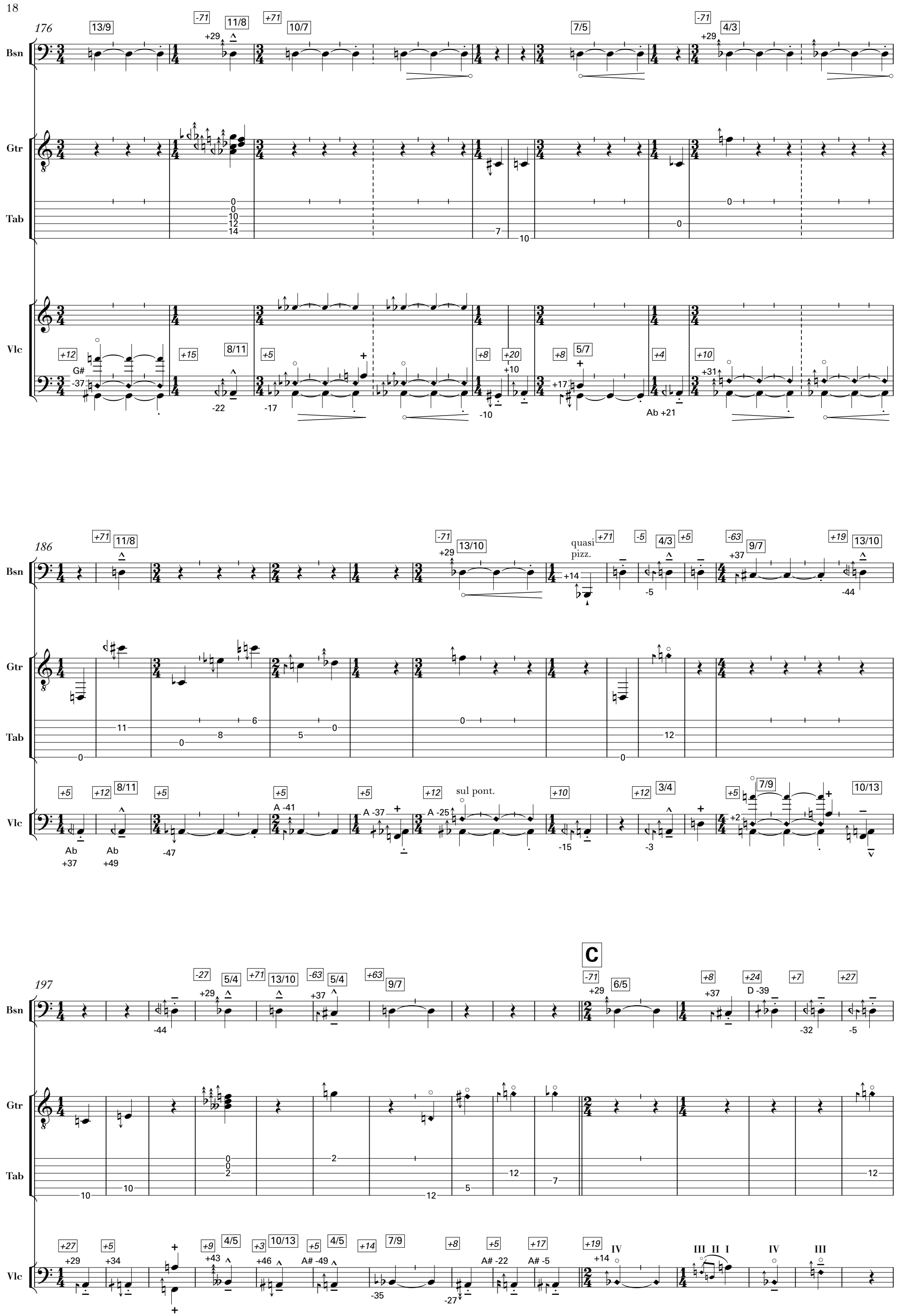
+17 -49 +5 -45 +5 E -39 +17 E -23


109
Bsn
Gtr
Tab
Vlc
118
sf
sf
125
(continue upward on IVth string)
134


145
Bsn
Gtr
Tab
Vlc
III
IV
sf


155
Bsn
Gtr
Tab
Vlc
II
Gb
sf


166
Bsn
Gtr
Tab
Vlc
G#
G +34
G +37


176
Bsn
Gtr
Tab
Vlc
186
quasi pizz.
sul pont.
197
C

212

Bsn

Gtr

Tab

Vlc

just press down l.h.

229

Bsn

Gtr

Tab

Vlc

pizz.

arco

244

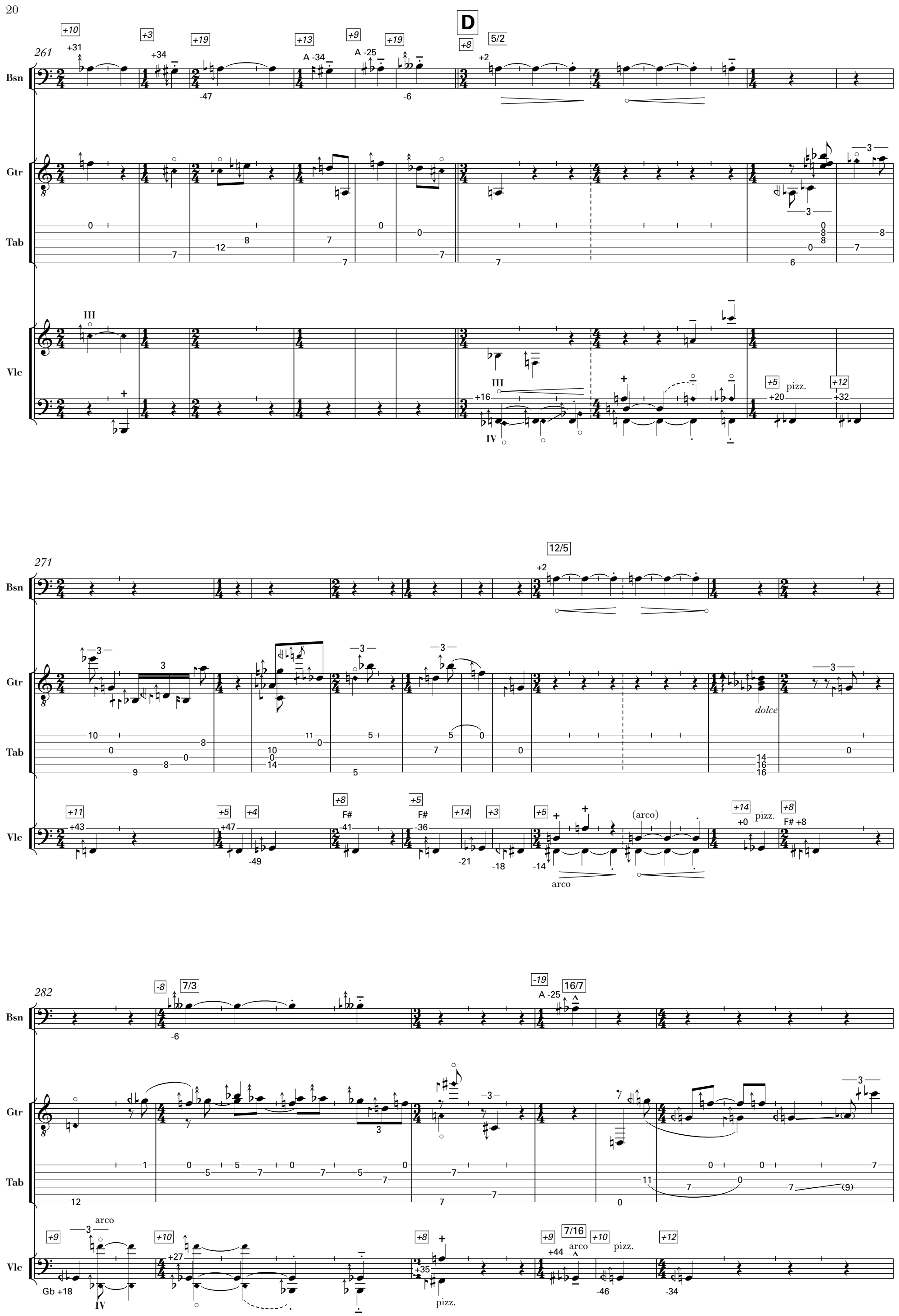
Bsn

Gtr

Tab

Vlc

quasi pizz.


261
Bsn
Gtr
Tab
Vlc
D
5/2
pizz.
271
12/5
dolce
(arco)
arco
282
7/3
16/7
7/16
Gb +18

288

Bsn

Gtr

come prima

Tab

Vlc

arco

pizz.

(pizz.)

298

Gtr

Tab

Vlc

308

Bsn

Gtr

Tab

Vlc

arco

pizz.

317

Bsn

Gtr

Tab

Vlc

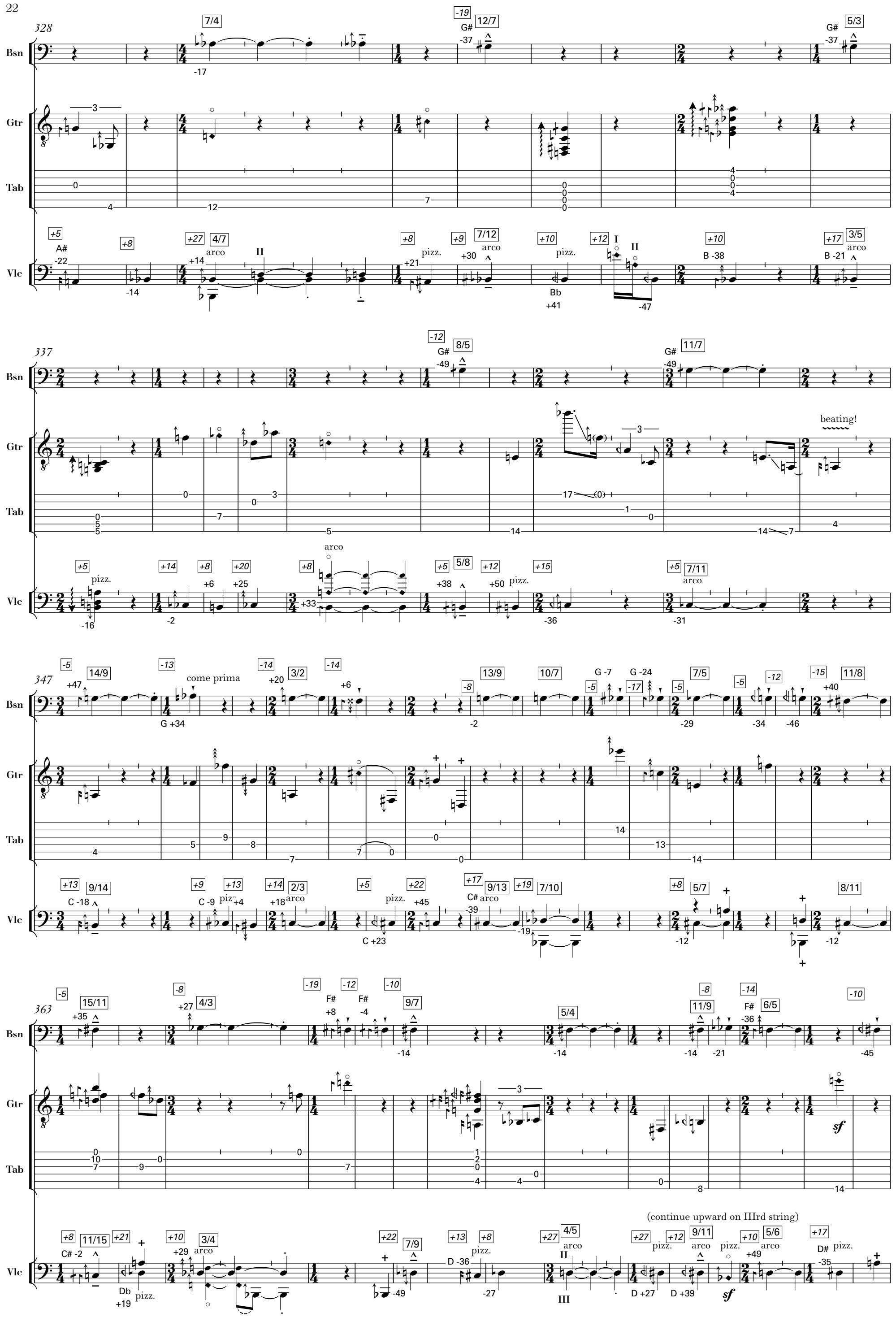
I II III

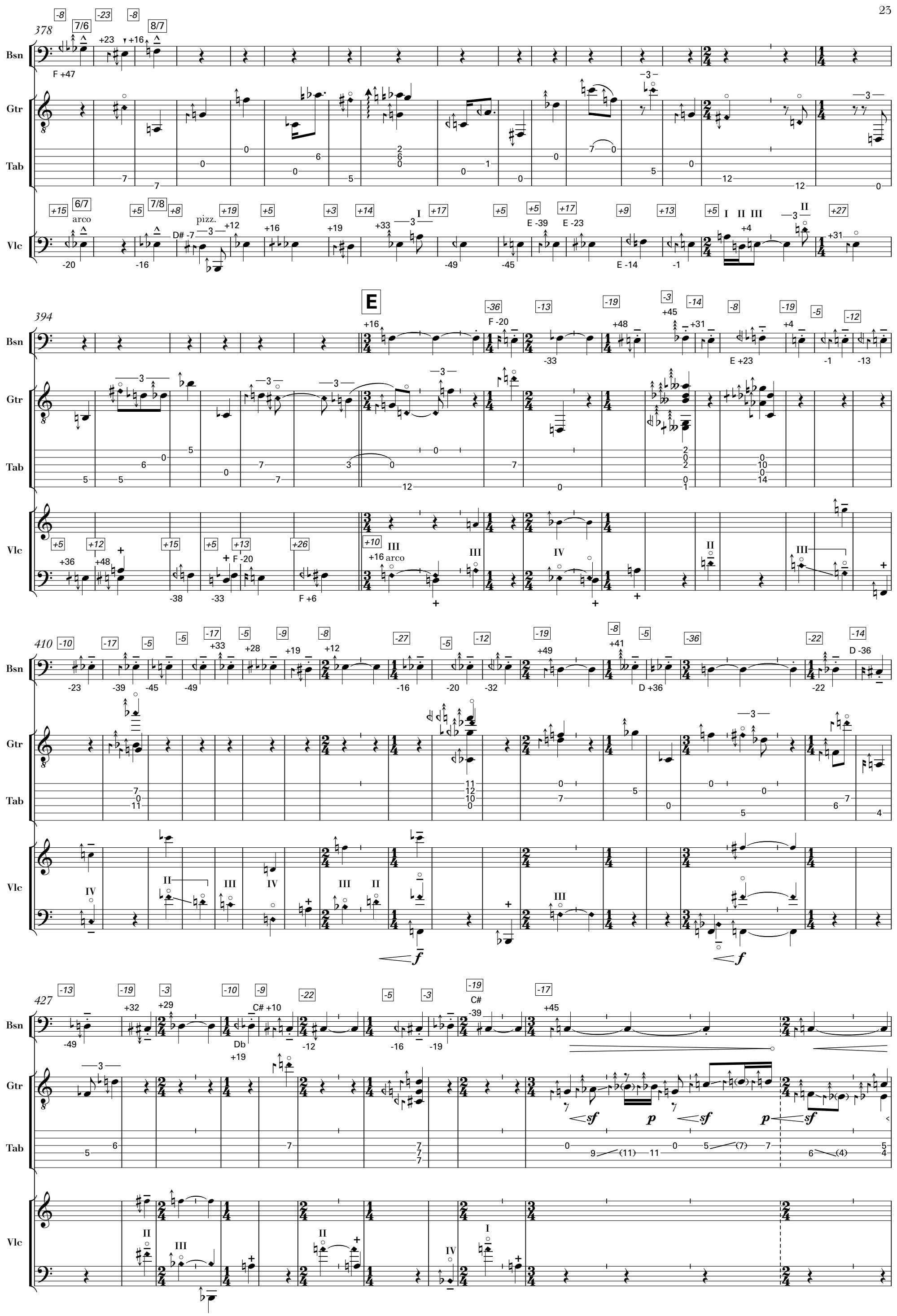
(pizz.)

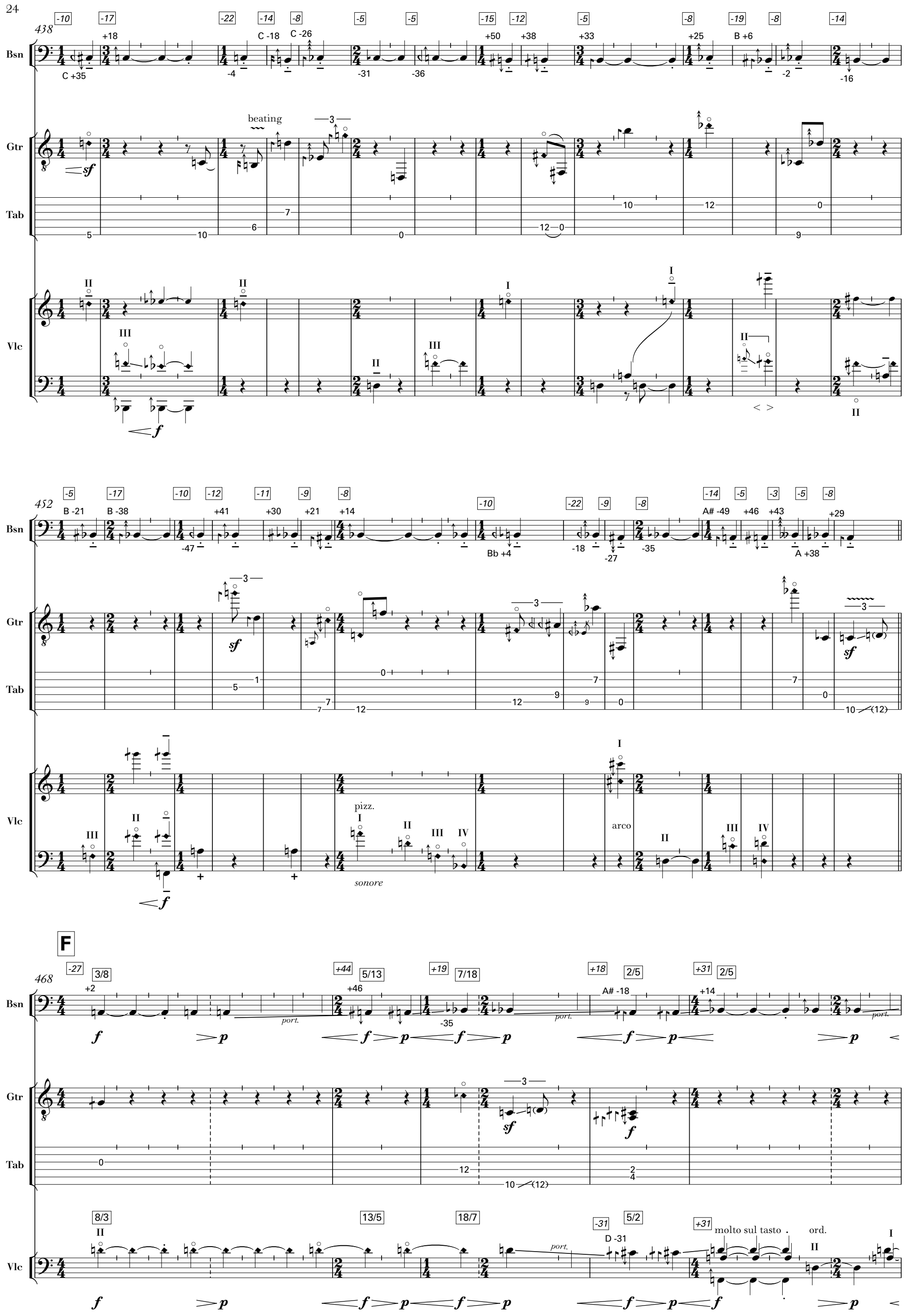
arco

quasi pizz.

pizz.


328
Bsn
Gtr
Tab
Vlc
337
347
363
arco
pizz.
come prima
beating!
(continue upward on IIIrd string)


378
Bsn
Gtr
Tab
Vlc
arco
pizz.
394
E
410
427
Db
C#
D#
D
F
f
sf
p


438
Bsn
Gtr
Tab
Vlc
beating
sf
f
452
pizz.
arco
sonore
molto sul tasto
ord.
port.
F
468

476

Bsn

Gtr

Tab

Vlc

482

Bsn

Gtr

Tab

Vlc

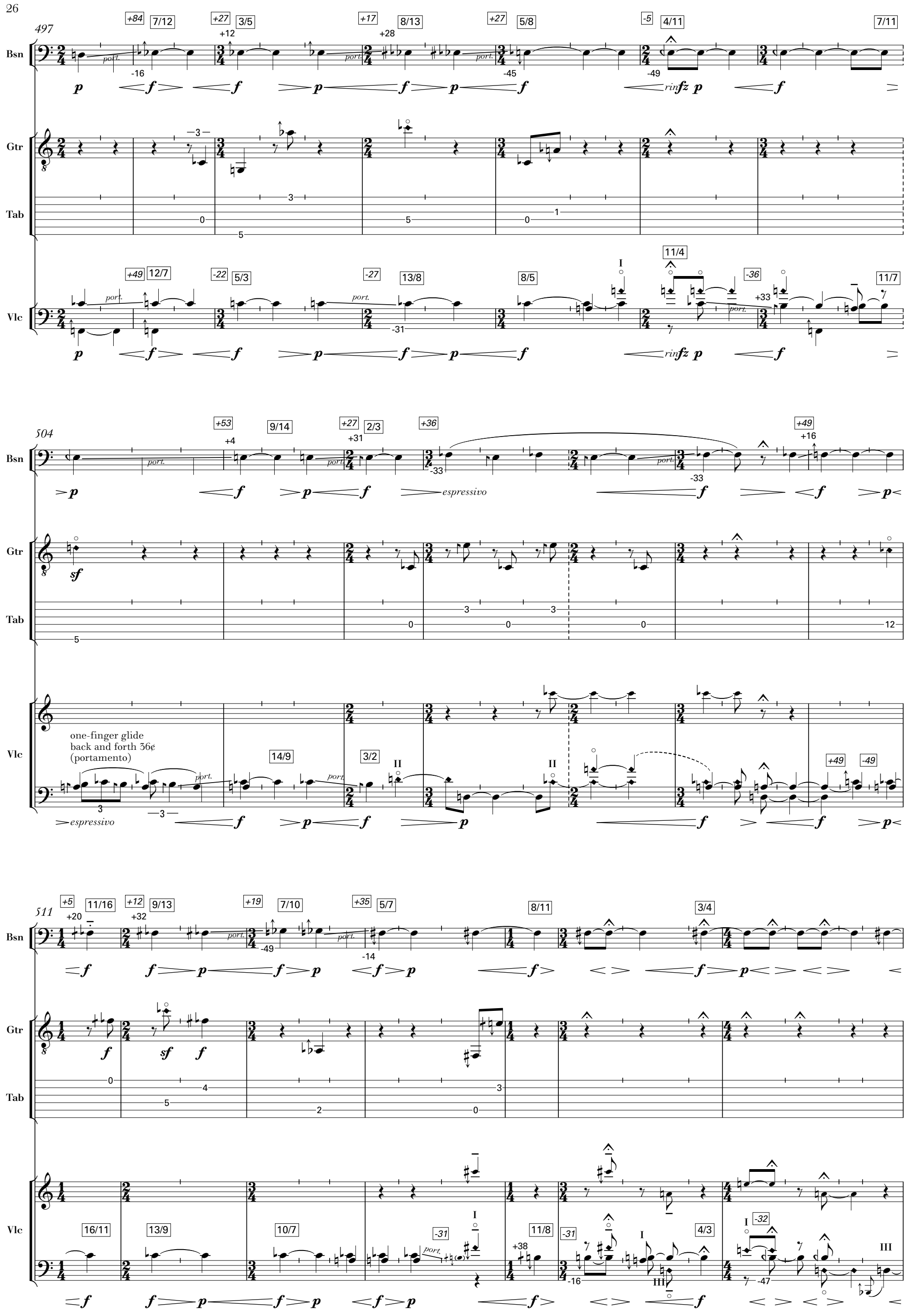
490

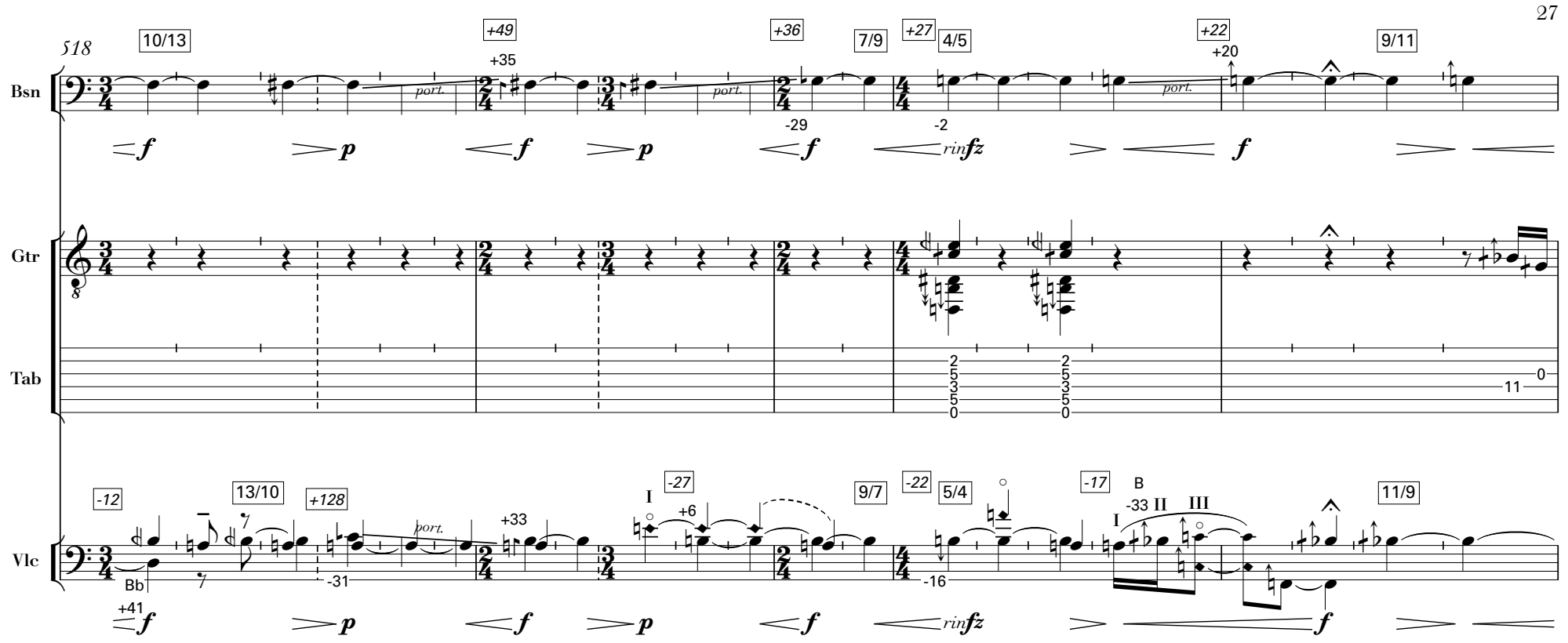
Bsn

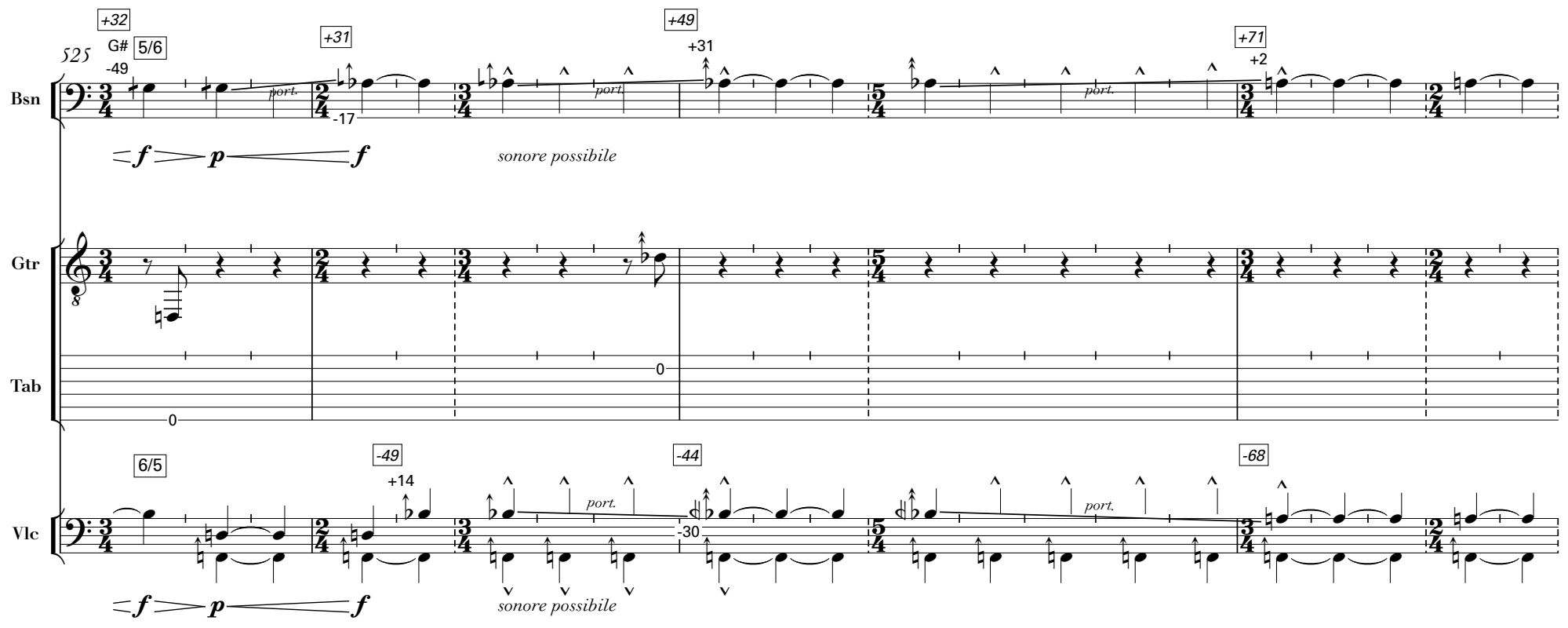
Gtr

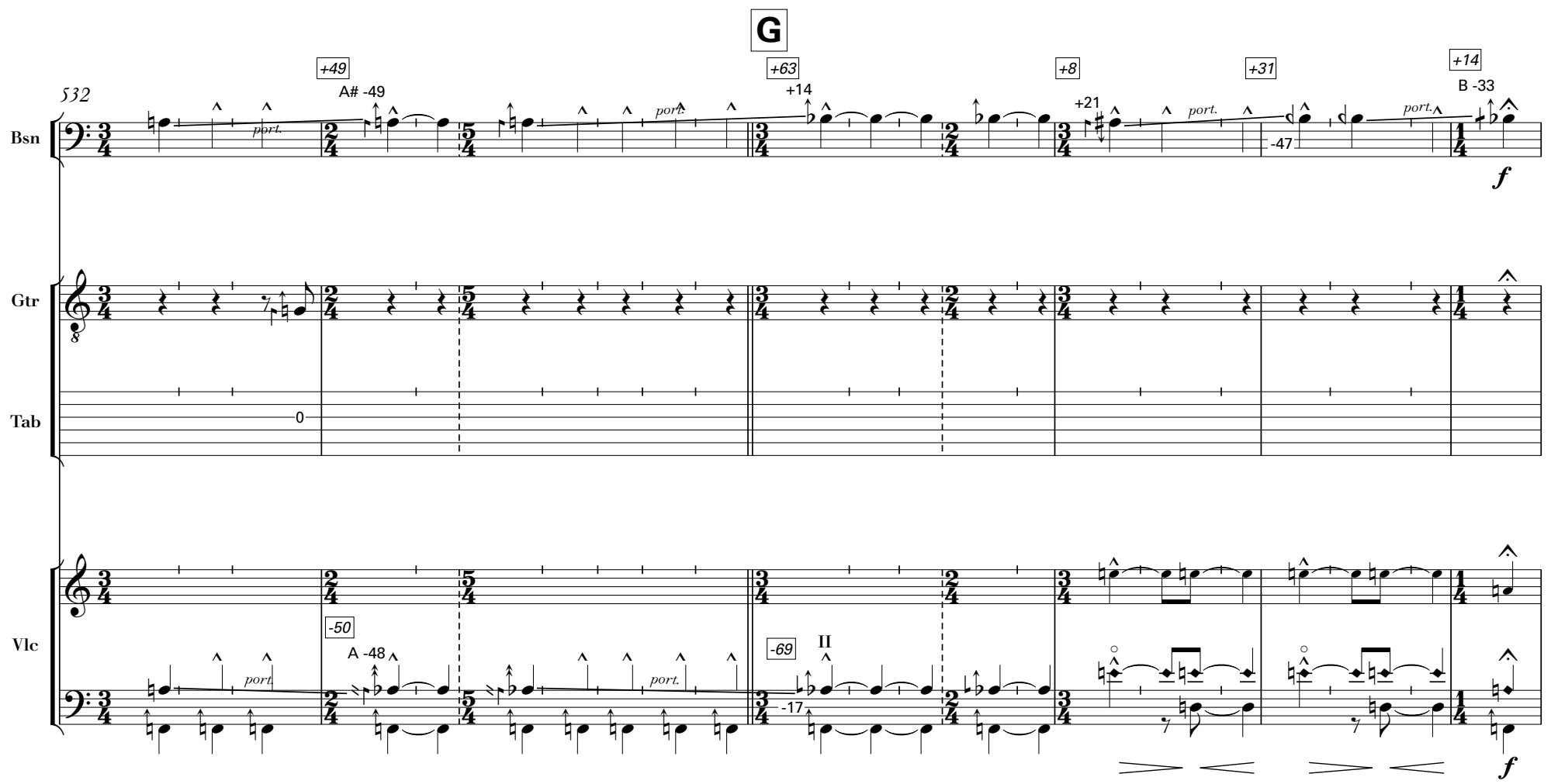
Tab

Vlc


497
Bsn
Gtr
Tab
Vlc
504
one-finger glide
back and forth 36¢
(portamento)
511


518
Bsn
Gtr
Tab
Vlc
10/13
+49
+35
+36
-29
7/9
+27
4/5
-2
+22
+20
9/11
port.
rinfz
-12
13/10
+128
-31
+33
-27
+6
9/7
-22
5/4
-16
-17
-33
11/9
Bb
+41


525
Bsn
Gtr
Tab
Vlc
+32
G#
5/6
-49
+31
-17
+49
+31
+71
+2
6/5
-49
+14
-44
-30
-68
port.
sonore possibile


G
532
Bsn
Gtr
Tab
Vlc
+49
A# -49
+63
+14
+8
+21
+31
-47
+14
B -33
-50
A -48
-69
II
-17
port.

540

Bsn

Vlc

547

Bsn

Vlc

554

Bsn

Vlc

poco a poco allargando

comodo al fine

561

Bsn

Gtr

Tab

Vlc

sotto voce

sotto voce

575

Bsn

Gtr

Tab

Vlc

582

Bsn

Gtr

Tab

Vlc

quasi Cadenza

(distance from D# in b. 1104)

sonore, ad lib.

H

588

Bsn

sotto voce, espr.

Vlc

(distance from Eb in b. 1132)

sotto voce, espr.

sonore, libero

594

Bsn

(force pitch upward as high as possible, stop earlier if necessary)

Vlc

attacca

4 : Thoreau Songs

Cantabile e libero

♩ ca. 48

1

Bsn

Gtr

Tab

Vlc

dynamics and
all fermatas ad lib.:
time may be stretched or
compressed as sonorities suggest

6

Gtr

Tab

Vlc

l.h.

E -35

mixtur ad lib., primary tones should be
11. and 5. partials over comma-raised Bb

11

Bsn

un poco sonore,
ma sotto voce

Gtr

Tab

Vlc

molto sul tasto
(3 strings at once)

ord.

un poco sonore, ma sotto voce

15

Gtr

Tab

p *f* *sonore* *sf* *p*

21

Bsn

pp *sotto voce, espr.*

Gtr

p *f* *sf* *pp* *f* *sf*

Tab

Vlc

II III IV

27

Gtr

sonore, libero a piacere *cantando*

Tab

31

Bsn

sotto voce

Gtr

f sonore *cantando semplice, delicato* *sf* *p*

Tab

Vlc

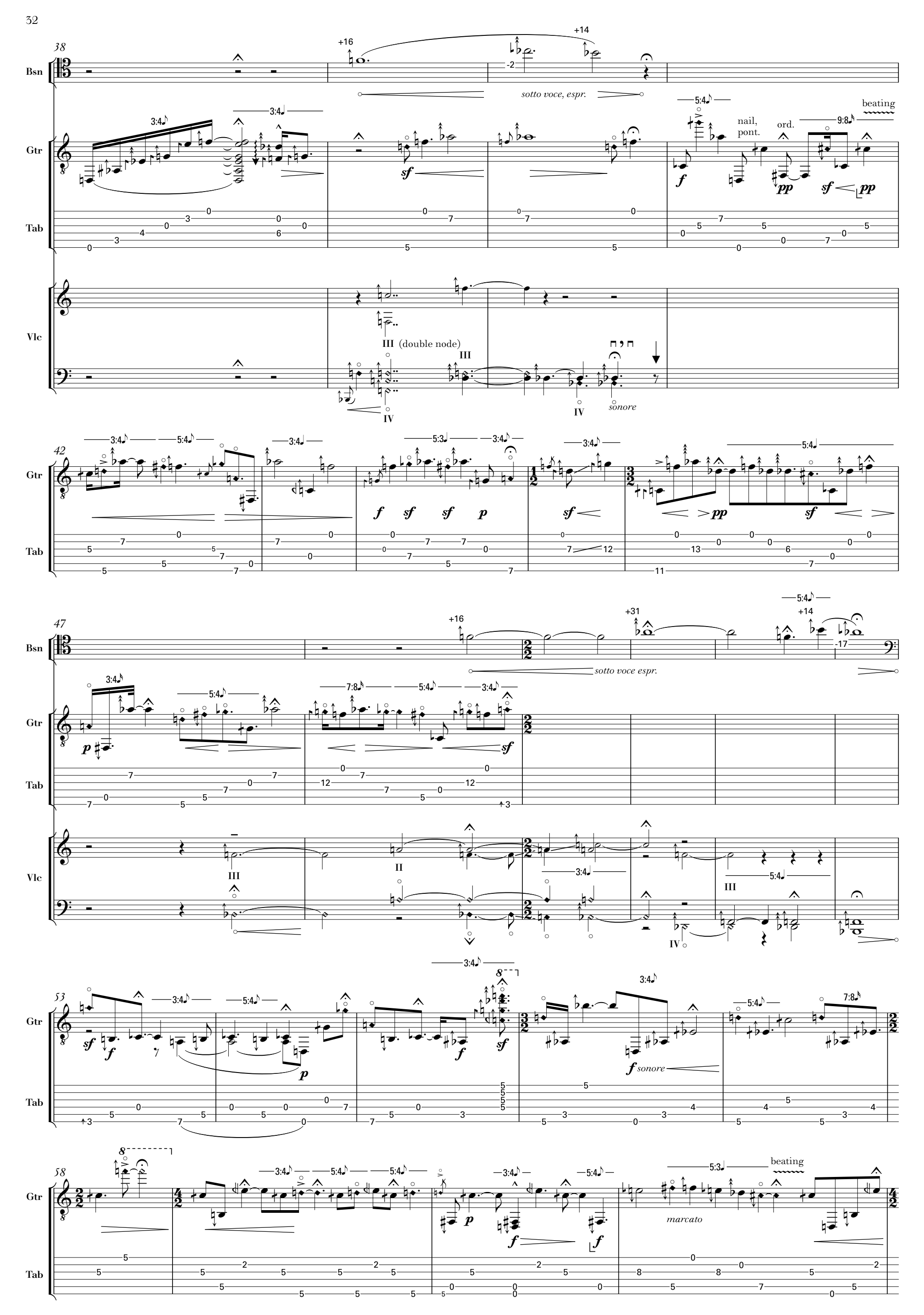
III *sotto voce*

34

Gtr

sonore, come prima nail, pont. ord. *f*

Tab


38
Bsn
Gtr
Tab
Vlc
sotto voce, espr.
nail, pont.
ord.
beating
III (double node)
III
IV
sonore
42
47
sotto voce espr.
II
53
sonore
marcato
58

62

Gtr

Tab

3:4 beating 5:4 5:4 3:4 5:3 3:4 5:4 beating

f *marcato* *p*

67

Gtr

Tab

5:4 beating 5:4 3:4 5:4

p *echo, come prima* *p*

71

Bsn

Senza misura al fine
coordinate with Cello

+16

sotto voce, espr. ma sempre molto semplice

Gtr

Senza misura al fine
proceed independently from Cello, Bassoon

5:4 beating 5:4 3:4

... libero al fine, a piacere

Tab

Vlc

Senza misura al fine
coordinate with Bassoon

III

port. ad lib.

sotto voce, espr. ma sempre molto semplice

77

Bsn

breathe freely as needed

+2 port. ad lib. +18 sim. +20

Gtr

sf *sf* buzz

Tab

take bow changes as needed

II I III IV III I IV III II I

Vlc

87

pause, allow Gtr. to emerge

Bsn

Gtr

beating

f *p* *sf*

Tab

pause, allow Gtr. to emerge

Vlc

99

Bsn

Gtr

beating

simile

Tab

Vlc

come prima

112

Bsn

Gtr

Tab

come prima

Vlc

124

Bsn

Gtr

Tab

Vlc

IV II III III III IV

port.

136

Bsn

Gtr

Tab

Vlc

II III

146

Bsn

Gtr

solo

sf

Tab

Vlc

II I

Berlin, 31 March 2014